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FROM THE
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U.S. Signal Corps
Manual No. 7

○
**PROPERTY AND DISBURSING
REGULATIONS**

**INCLUDING MISCELLANEOUS GENERAL
REGULATIONS**

Signal Service
SIGNAL CORPS, UNITED STATES ARMY

Prepared under the direction of
Brigadier-General A. W. GREELY, Chief Signal Officer of the Army

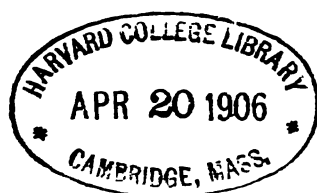
By
Captain C. DEF. CHANDLER
Signal Corps

1906

WASHINGTON
GOVERNMENT PRINTING OFFICE
1906

64-2999.06.3

100 5757.10



From the
U. S. Government

WAR DEPARTMENT,
SIGNAL OFFICE,
Washington, D. C., January 6, 1906.

The following regulations regarding property accountability have been prepared under authority of Act of Congress approved October 12, 1888, which reads as follows:

"Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That from and after the passage of this Act every officer of the Signal Corps and all other officers, agents, or persons who now have in possession or may hereafter receive or may be intrusted with any stores or supplies shall quarterly, or more often, if so directed, and in such manner and on such forms as may be prescribed by the Chief Signal Officer make true and correct returns to the Chief Signal Officer of all Signal Service property and all other supplies and stores of every kind received by or intrusted to them and each of them or which may in any manner come into their and each of their possession or charge. The Chief Signal Officer, subject to the approval of the Secretary of War, is hereby authorized to draw up and enforce in his bureau a system of rules and regulations for the government of the Signal Bureau and of all persons in said bureau and for the safe keeping and preservation of all Signal Service property of every kind and to direct and prescribe the kind, number, and form of all returns and reports and to enforce compliance therewith."

The contents are compiled from Army Regulations, 1904, orders, and circulars of the War Department and Signal Office and decisions pertaining to property and disbursing matters.

General regulations for the Signal Corps have also been incorporated in this manual.

A. W. GREELY,
Brigadier General,
Chief Signal Officer of the Army.

DECEMBER 23, 1905.

Approved:

WM. H. TAFT,
Secretary of War.

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Article I.

MISCELLANEOUS GENERAL REGULATIONS.

AUTHORITY FOR MANUALS.

1. The manuals concerning the several staff departments will contain, besides extracts from general regulations, such rules as have special application; but no regulations, orders, or instructions will be embodied therein which are in conflict with the Regulations of the Army. (Decis. Sec. War, Oct. 31, 1895.)

2. Manuals issued by the staff departments and approved by the Secretary of War, when not in conflict with any of the provisions of these regulations, will have equal force therewith. (A. R., 1602.)

3. The scope of the duties of the Signal Corps is set forth in the Army Regulations and United States statutes. The chapter of Army Regulations entitled "Article LXXX" contains all general regulations for the Signal Corps, military telegraph lines, and the supply of property by the Signal Bureau. (See paragraphs 1588 to 1600, A. R.)

VISUAL SIGNALING INSTRUCTIONS.

4. The Army and Navy Code (Myer) was prescribed by General Orders 32, Adjutant General's Office, August 1, 1896, to be effective on and after October 1, 1896, this code to be used for all visual signaling.

The Army Regulations prescribe that at least two enlisted men in each troop, battery, and company shall be able to exchange messages in the Army and Navy Code by flag. To this end the Signal Corps issues a complete visual signal outfit to each organization, consisting of two 2-foot flag kits and two field glasses.

ADMINISTRATIVE DIVISIONS OF SIGNAL OFFICE.

5. Signal Office orders from time to time have assigned certain duties to the several administrative divisions of the Signal Office. These duties at present are as follows:

(a) *Administrative division*.—Will have charge of the routine work of the Signal Office; the receipt and distribution of the mail; general office correspondence; the care and preservation of the office files, and all matters affecting the commissioned, enlisted, and civilian force of the Signal Corps.

The officer in charge of the administrative division will exercise general supervision and sign the mail pertaining to the electrical division, to the examining division, or to the telegraph division during any temporary absence of the officer in charge, provided that some other officer shall not have been specially designated by the Chief Signal Officer of the Army for the performance of these duties.

(b) *Disbursing division*.—Will be charged with the preparation of estimates for appropriations by Congress; the keeping of accounts of, making requisitions upon, and arranging for transfer to officers from such appropriation; the procuring of quotations, samples; issuing of advertisements; abstracting bids; making awards; placing orders; arranging for inspection and shipment of supplies; the giving notice to consignees; the invoicing and proper accounting for such supplies; the payment of accounts; the collecting of bills, and all other duties pertaining to disbursements.

(c) *Electrical division*.—Will have charge of the electrical work of the Signal Corps, the selection of special and general apparatus and devices, of executive functions relative to electrical matters and fire control, and requisitions for electrical material and supplies, excepting such as pertain to the telegraph division. All requisitions for supplies and material will be sent to this division for record and then referred to the proper officer for action, and all subsequent communications, memoranda, reports, etc., relating to said requisitions will be filed in this division with the wrapper of the original requisition. Requisitions pertaining to interior posts or Signal Corps telegraph and cable offices will be referred to the telegraph division for action after numbers shall have been assigned. For location of property, record copies of all invoices sent to this division for file with requisitions will be sent to the telegraph division to make any extracts that may be necessary to maintain the records of that division.

(d) *Examining division*.—Will have charge of all matters relating to the auditing of money and property accounts of persons responsible to the United States for money or property pertaining to the Signal Corps of the Army.

(e) *Telegraph division*.—Will have charge of all matters relating to the operation, maintenance, and repair of United States Signal Corps telegraph, telephone, and cable lines. There will be kept in this division a card record of all Signal Corps lines, including those in insular possessions. Data relating to these lines will be carded in a brief manner for ready reference. All requisitions for material or supplies will be centered in this division for administrative action, and all subsequent communications, memoranda, reports, etc., relating to said requisitions will be referred to this division. Requisitions pertaining to fire-control installations will not be referred to the telegraph division. A card record will be kept of the War Department Telegraph Codes and other codes issued by this division.

(f) No officer in charge of a division will authorize or approve any account involving the expenditure of money or property in which he may be personally interested, all such accounts being referred to the assistant to the Chief Signal Officer for action.

All papers pertaining to the work of any established division will, upon receipt, be sent by the chief clerk to the proper division for record or file.

The electrical division of the Signal Office will assign serial numbers to new instruments at the time of their purchase.

6. Whenever authority is given by the Chief Signal Officer of the Army for the manufacture of special devices in which drawings or specifications of any character are required, where these latter are not furnished from the office of the Chief Signal Officer of the Army, one copy of such drawing and specification will be mailed to the electrical division, office of the Chief Signal Officer of the Army, Washington, D. C., for file and future reference.

REPORTS AND REGULATIONS CONCERNING PERSONNEL.

7. To determine the relative rank of noncommissioned officers of the Signal Corps with other noncommissioned officers of the same grade in the Army, refer to paragraph 9 of the Army Regulations and the several amendments thereto. Promotions and reductions in the Signal Corps are made by the Chief Signal Officer of the Army or by his authority. All enlistments are usually made in the grade of private; but the Chief Signal Officer of the Army is authorized to enlist men in the noncommissioned grades in special cases.

8. No officer, clerk, or employee in the United States Government employ shall at any time solicit contributions from other officers, clerks, or employees in the Government service for a gift or present to those in a superior official position; nor shall any such officials or clerical superiors receive any gift or present offered or presented to them as a contribution from persons in Government employ receiving a less salary than themselves; nor shall any officer or clerk make any donations as a gift or present to any official superior. Every person who violates this section shall be summarily discharged from Government employ. (Sec. 1784, R. S.)

Executive Order.

9. No officer or employee of the Government shall, directly or indirectly, instruct or be concerned in any manner in the instruction of any person or classes of persons, with a view to their special preparation for the examinations of the United States Civil Service Commission.

The fact that any officer or employee is found so engaged shall be considered sufficient cause for his removal from the service.

THEODORE ROOSEVELT.

THE WHITE HOUSE, October 13, 1905.

10. Officers obtaining leaves of absence or permission to delay en route in changing stations from authority other than that of the Chief Signal Officer of the Army are directed to promptly notify the Signal Office in writing as far as practicable in advance of such leave or delay and give prospective date of leaving station and of return. Officers while on leave of absence will keep the Chief Signal Officer advised of any change of address in order that they may be communicated with if necessary.

11. Hereafter no enlisted man of the Signal Corps will be granted a furlough to visit the United States without being informed that the Chief Signal Officer of the Army will grant no changes of station to men on furlough unless such changes shall be recommended by the signal officer to whose command the furloughed soldier belongs.

12. Under no circumstances will Signal Corps men returning to the United States from either the Philippine Islands or Alaska on furlough be allowed to surrender said furlough with the understanding that they are to be assigned to stations in the United States, unless the reasons as to why the change of station should be made are set forth and the approval to such change furnished by the soldier's immediate commanding officer.

13. When an enlisted man of the Signal Corps is ordered to station in a territorial division in which the men of that corps are assigned to a company other than that to which the man belongs, his descriptive list required by paragraph 113, Army Regulations, will be made in duplicate, the original to be forwarded to the commanding officer of the station to which the soldier is sent, the duplicate to the commanding officer of the Signal Corps company to which the soldier's new assignment carries him, for use in the preparation of muster roll of said company.

14. Officers of the Signal Corps, recommending for foreign service short-term men who have announced their intention of reenlisting will in each case require from such men a statement in writing that they will reënlist upon the expiration of their present term of service. In all such cases the original paper will be forwarded to the Signal Office at the earliest date, and if practicable with the recommendation for the assignment to foreign service.

15. Enlisted men of the Signal Corps are not entitled to extra-duty pay for services of any kind rendered for the Signal Corps. For extra-duty pay as a teamster, baker, or such duty not in the line of Signal Corps work, application should be made by the post commander to The Military Secretary War Department, requesting authority of the Secretary of War for extra-duty pay. This authority can not be retroactive, and such soldiers are not entitled to extra pay until the date of such authority.

16. Detachments of the Signal Corps are ordinarily exempt from detail for any other duty. In this connection see paragraph 369,

Army Regulations, and paragraph 2, Circular 48, War Department, 1904.

17. As a rule, warrants of noncommissioned officers reenlisting in the Signal Corps will be continued in force only in cases where the soldier reenlists within thirty days and has been given excellent character.

18. An enlisted man of the Signal Corps, whose character is excellent and who on account of expiration of term of service is discharged in Alaska or en route to the United States from the Philippine Islands or Alaska, will, if he is reenlisted within thirty days from the date of discharge, be continued in the grade held by him at discharge unless there are specific orders to the contrary. Where term of service is to expire under the above conditions and the character to be given is below the grade of "excellent," the commanding officer of the company wherein the man is serving will notify the Chief Signal Officer of the Army by mail of the character to be given sufficiently in advance to receive the decision of the Chief Signal Officer, by mail, prior to discharge, whether the soldier will be continued in the grade in which he is serving at the time of discharge.

19. Master signal electricians of the Signal Corps should be addressed in writing, and referred to in reports, under their full title. They can, however, be verbally addressed "Electrician."

20. Enlisted men of the Signal Corps are expected to perform all duties in connection with the transmission of military information for the use of the Army. At military posts it is discretionary with post commanders to require them to assist the post signal officers in the matter of signal instruction, care of the Signal Corps property, etc., as the former may deem the public interests or special conditions require.

21. Signal officers are enjoined to exercise great care in making recommendations for foreign service. Men of indifferent character, or dissipated habits, should be kept on duty within the limits of the United States, where they can be disciplined and supervised; nor should men of weak physique be recommended for foreign service. Unsuitable men are a source of weakness and injury either in Alaska or the Philippines, where Signal Corps men generally serve on detached duty.

22. When muster rolls of Signal Corps men are rendered to The Military Secretary, a copy will also be sent to the Chief Signal Officer of the Army for the information of his office.

23. Whenever an enlisted man of the Signal Corps dies or is discharged by any signal officer, the commanding officer will immediately inform the Chief Signal Officer of the Army by telegraph. In case of discharge, he will add whether certificate and final statements have been furnished the soldier. In the Philippine Islands this informa-

tion will be communicated by letter to the chief signal officer, Department of California, at San Francisco, who will telegraph it to the Signal Office, Washington.

24. Whenever enlisted men of the Signal Corps are returned to the United States by virtue of a furlough from the Philippines or Alaska the Chief Signal Officer of the Army should be notified at once, in writing, and the descriptive list of such soldier forwarded, if from the Philippines, to the chief signal officer, Department of California, and if from Alaska, to the chief signal officer, Department of the Columbia. The soldier should also be directed to report his post-office address to the same office and to the Chief Signal Officer of the Army in order that he may be communicated with, if necessary.

25. An official copy of all serial orders issued by officers in charge of military telegraph lines must be forwarded to the Chief Signal Officer, for his information, on the date of issue.

26. No personal reports (Form No. 212) of enlisted men of the Signal Corps on detached service from their companies will be sent to the Chief Signal Officer of the Army; but such reports will be forwarded to the chief signal officer of the department in which the men are serving through commanding officer of the Signal Corps company to which the soldier belongs. Chief signal officers of departments upon receipt of personal reports from all detached men serving in their departments will consolidate at the end of each month the information contained in these reports and forward such consolidated reports, in duplicate, direct to the Chief Signal Officer of the Army.

27. In order to perfect the records of the War Department, chief signal officers of departments will note in their monthly reports the name of every telegraph or telephone office established or discontinued in their department during the month. There is required from each military telegraph office a monthly report (Form 134) showing the total number of and tariff value of all commercial and official messages received and sent during the previous month.

28. Official communications from telegraph operators pertaining only to telegraph administration should be forwarded direct to the officer in charge of the line; but communications relating to other matters, such as clothing, pay, rations, etc., should be forwarded through the post commander.

29. In order that accounts of the Signal Corps men for clothing may be properly adjusted, signal officers are informed that under date of August 19, 1903, the Assistant Secretary of War approved the opinions of the Quartermaster-General and the Judge-Advocate General of the Army to the effect that the clothing allowances of enlisted men of the Signal Corps should be computed on the basis of mounted troops.

EXAMINATIONS FOR NONCOMMISSIONED GRADES.

30. Examinations for the eligible list for first-class sergeants and competitive examinations for vacancies as master signal electricians will be held in January and July of each year. The eligible list of promotions for advancement to the grade of first-class sergeant will be confined to sergeants who have had excellent records as sergeants for not less than six months.

31. Competitive examinations for advancement to the grade of master signal electrician will be confined to sergeants and first-class sergeants of at least a year's service in such grades with unbroken excellent records during such period.

32. Applications for examinations of men serving in the United States and Alaska must reach the office of the Chief Signal Officer of the Army not later than June 1 and December 1 of each year. Candidates for examination in the Philippines will be designated by the chief signal officer of the division, who will make due arrangements for such examinations.

33. The scope of examination will be announced from time to time in Signal Office orders.

SIGNAL CORPS COMPANIES FOR FIELD SERVICE.

34. The Field Service Regulations for the Army, 1905 edition, prescribe an allowance of one company of Signal Corps to each division of troops, the company of Signal Corps for the cavalry division to be mounted.

The organization of a Signal Corps company in the field, prescribed by the Field Service Regulations, is as follows:

Captain.....	1
Lieutenants.....	3
First sergeant.....	1
Quartermaster sergeant.....	1
Sergeants, first class.....	20
Sergeants.....	40
Corporals.....	10
Privates.....	74
Cooks.....	4
Total enlisted.....	150

35. Whenever any Signal Corps command returns to its regular station from field service, it is the duty of the senior commanding officer present at the post to thoroughly inspect all apparatus and appliances belonging to the returning command. Such equipments should be placed in as thoroughly efficient condition as possible from local means, and if necessity requires, prompt requisition should be

made for authority to make such repairs as may require an additional allotment for the purpose.

In addition to the above inspection, commanding officers of Signal Corps posts or companies should personally and thoroughly inspect the condition of all special vehicles or appliances at their posts, so that their commands can promptly take the field thoroughly equipped and fitted for efficient service. The practice of deferring repairs and equipment until marching orders are received is highly detrimental to the public interests and to the efficiency of the corps.

36. Field telephone and buzzer stations of the Signal Corps established in active service and maneuvers shall be indicated by displaying a 2-foot red signal-flag as a marker to indicate the location of the stations, this flag to be displayed with as much prominence as the circumstances and location of the stations warrant, but it should not be visible to the enemy.

TELEGRAPHING AND TELEGRAPH ACCOUNTS.

37. General Order No. 9, Adjutant General's Office, 1899, directs that only such words be used in cable dispatches as are necessary to clear comprehension of their contents, and prescribes certain code addresses for chiefs of bureaus and others of the War Department.

38. The requirements of paragraphs 1194, 1197, 1198, 1592, and 1593, Army Regulations, are held to be applicable to official telegrams sent over the United States military telegraph lines in Alaska and the Philippine Islands. These lines will be used only in cases of necessity, in which the delay consequent upon transmission by mail would be prejudicial to the public interests. In order to secure economy, officers are expected to observe the same degree of brevity in framing official messages as in the preparation of private telegrams.

39. The provisions of section 2, paragraph 1196, Army Regulations, with reference to the necessity of an officer submitting an explanation when it is questionable whether a telegram is on official business or whether the telegraph should have been used, are extended to telegrams sent over military telegraph lines in Alaska and the Philippine Islands. In case such explanation is not satisfactory, the officer filing the telegram will be charged therefor at the authorized commercial rates.

40. Official telegraph blank forms (blue) are supplied by the Quartermaster's Department and not by the Signal Corps. These forms are for all messages which pass over any commercial telegraph line.

41. At all central telegraph offices of the United States military telegraph lines, where in the opinion of the department chief signal officer the importance of the lines justifies, means will be provided for making regular tests of the electrical condition of the lines. An abstract showing the character and results of the tests, with appropriate notes,

will be set forth in the monthly reports of the telegraph lines sent to the Office of the Chief Signal Officer of the Army by department chief signal officers.

42. At every permanent station of the Signal Corps the word "Signals" will be the official address of the senior officer, noncommissioned officer, or civilian employee present, and telegraph companies, post-offices, and other proper persons should be duly notified. When telegrams are sent to individual officers, the surname of such individual will precede the word "Signals."

43. Officers in charge of divisions of military telegraph lines in the United States and Alaska, who under existing orders render accounts current of telegraphic receipts to the Chief Signal Officer of the Army, will hereafter furnish to the chief signal officer of the department in which the lines may be located or to those officers specially designated to have charge of these lines a copy of their monthly account current without vouchers. This copy will be forwarded at the same time as the copies sent to the Chief Signal Officer of the Army.

44. The signal officer to whom the copies mentioned in the foregoing paragraph are forwarded will keep in his office a ledger account showing the amount received each month by each officer, the amount transmitted or deposited, the amount remaining on hand, and such details as may be considered necessary.

45. It will be a part of the duties of the department chief signal officer or other designated officer to see that the officers and noncommissioned officers responsible for telegraph receipts deposit or transfer these receipts promptly. In case of delays proper instructions should be issued to correct such delinquencies and prevent their recurrence.

46. Accounts current relating to the Philippine telegraph system will be forwarded to and adjusted in Manila in such a manner as the chief signal officer of the division may direct. He will, however, forward to the Chief Signal Officer of the Army an abstract showing the total amount received, transferred, deposited, etc., for each month, the above abstract to be forwarded as soon as the accounts for all stations have been examined and adjusted.

47. In view of the fact that the submarine cables are laid for a definite purpose along routes determined and approved by competent authority, no signal officer will either establish an additional office on a cable system or, beyond the necessities of occasions for seeking better bottom, change the route of any Signal Corps cable without such change having been submitted to and approved by the Chief Signal Officer of the Army or other competent superior authority. Similar principles will govern the maintenance and repair of military land lines.

48. When repairs are made on Signal Corps cables in which there are faults, the party repairing the fault will send direct to the office of

the Chief Signal Officer of the Army a piece of the core containing this fault—about 6 inches in length—with a brief statement of the circumstances under which the fault was discovered and repaired. Whenever in the location of the fault it is necessarily burned out to such an extent as to render the original trouble unrecognizable, it should be so stated in the report accompanying the piece of core. Whenever a cable is broken by anchor or other means, the piece of the core at the broken ends will be sent in.

WAR DEPARTMENT TELEGRAPH CODES.

49. The regulations concerning care and accountability for War Department telegraph codes at posts are set forth in paragraph 1195, Army Regulations.

50. By direction of the Secretary of War, the Chief Signal Officer of the Army is charged with the preparation of a suitable telegraphic code for the official use of the Army, and until such code is perfected the "Western Union Telegraphic Code" is adopted as a supplement to the "Telegraphic Code to Insure Secrecy in the Transmission of Telegrams" (War Department code now used), and will be furnished on requisition. Extra sheets containing sentences peculiarly suited for military use will be prepared by the Chief Signal Officer and forwarded from time to time for insertion in this code. Such special vocabularies and instructions as may be incorporated in this code must be closely followed. The two codes must not be used conjointly.

REGULATIONS CONCERNING PROPERTY.

51. All reference to Signal Corps property and designation of standard articles must conform exactly to the enumeration in this manual. All articles not enumerated herein should be referred to and accounted for as invoiced.

52. At least once each year department chief signal officers will take steps to ascertain the amount of surplus, obsolete, and unserviceable Signal Corps property at each post in the department. Such reports should be forwarded to the Chief Signal Officer of the Army with recommendation for redistribution to other posts or transfer to property depot, as the best interests of the service require.

53. Under repeated decisions connected with various paragraphs of the Army Regulations enlisted men in charge of telegraph offices or of isolated signal stations are considered to be acting as sergeants of the Signal Corps and will be held accountable for public property under paragraph 699 Army Regulations. It is explicitly stated, however, that neither officers of the Signal Corps nor post signal officers are permitted, except under competent local authority, to devolve their property responsibility on enlisted men serving immediately under them.

54. When a station is discontinued, the disposition of the property,

other than that for which a signal officer is responsible, will be ordered from the office of the Chief Signal Officer or department signal officer and in any event the officer or other person in charge will be held responsible that each article is properly disposed of as ordered.

55. Articles of public property issued to a company for its exclusive use will, when practicable, be marked with the letter or number of the company and number and arm of the regiment. Articles will *not* be marked with the number of the man in the Signal Corps. (Extract from par. 286 A. R.)

56. Serviceable parts from unserviceable American Bell telephones can be utilized with other American Bell telephones that are lacking in such parts, thereby making the latter serviceable.

57. The contract between the Signal Corps and the American Bell Telephone Company prohibits the use of the rented instruments of that company's make on the same line with instruments of other manufacture. It is the duty of department signal officers to see that the terms of this contract are strictly adhered to at all military stations within their jurisdiction.

58. Repairs to Signal Corps telephones which require dismounting of parts will be made only at supply depots of the Signal Corps properly equipped for the purpose. Unserviceable telephones at posts should be reported to the chief signal officers of departments with a view to having them shipped to depot for repairs. This, however, does not apply to telephone experts of the Signal Corps, who are sent to posts for the purpose of placing the telephone system in order.

59. Previous regulations of the Signal Corps prescribe that only one officer at each post shall be accountable for Signal Corps property, and others shall obtain articles from him on memorandum receipt. Such regulations are hereby amended to except the new visual signal outfits, consisting of two field glasses and two 2-foot flag kits, which are issued to company commanders and should be retained and accounted for by them.

INSPECTIONS.

60. In the inspection of wire or cable under specifications from the Office of the Chief Signal Officer of the Army the inspector will in all cases secure samples of each separate lot of wire, (bare or insulated,) armor wire, cable core, and cable. One sample of wire or core about 20 feet long and cable about 1 foot long should be taken from each lot and the same transmitted to the Office of the Chief Signal Officer, labeled with the date of manufacture, the manufacturer's name, the cable for which the wire is intended, and the order under which the purchase is being made. Inspectors will also submit with their report a suitable number of short samples tested under their own supervision, so that there may be on file representative specimens of each lot.

FIRE CONTROL INSTALLATIONS.

61. The engineering circulars issued by the electrical division, Signal Office, are of a confidential nature, and all civilian employees and others receiving them are enjoined to carefully consider them as such. These circulars are issued to all electrical engineers and assistants, so that they may be informed of new pieces of apparatus, diagrams, or alterations and improvements in old types; also, instructions as to procedure in administrative matters.

62. The engineering circulars are issued in a separate series for each subject according to the following schedule:

- A. Personal Equipment; Property Papers; Reports; Expense Accounts; Forms.
- B. Arrangement of Stations.
- C. Mining Equipment.
- D. Supplies for Permanent Construction.
- E. Telephones.
- F. Memoranda; Manuals.
- G. Installation of Apparatus; Circuits.
- H. Tools.
- I. Terminals.
- J. Line Construction.
- K. Orders.
- L. Temporary Installations.
- M. Cables.
- N. Supply Cabinets.
- O. Approved Equipment by Stations.
- P. Aeroscope and Telautographs.
- Q. Method of Procedure in Turning Over Installations of Fire Control.
- R. Interpretation of Standard Diagrams and Charts.
- S. Telegraph Apparatus.
- T. Insulating compounds.
- U. Testing.
- V. Modifications in Circuits or Instruments.
- W. Switchboard rooms.
- X. Switchboards.
- Y. Miscellaneous.
- Z. Obsolete circulars.

63. Noncommissioned officers in charge of Signal Corps storerooms in artillery districts will immediately upon the receipt of delicate apparatus and before opening and unpacking report its arrival to the senior civilian engineer in charge of the installation and request an inspection. The purpose of this inspection is to determine the condition of the apparatus upon its arrival in the district, and the storekeeper will be held responsible for any deterioration which may develop in the apparatus during the period in which it is under his care. Civilian experts will report upon the condition of such apparatus to the officer in charge of the installation, a copy of the report being furnished the storekeeper.

64. Officers of the Signal Corps in charge of central storerooms will arrange for an expert inspection of all apparatus received by them immediately upon its arrival and before opening and unpacking. The purpose of this inspection is to determine whether or not the apparatus received has been injured in shipment and so far as possible to determine whether or not the instrument is operative. It is not intended that any attempt should be made to compare the articles with the specification; but it is necessary that any defects arising from carelessness in handling be reported to the chief signal officer of the department without delay.

65. Cable records.—Upon the completion of any installation of subterranean or submarine cables a complete record showing the use of each conductor of each cable and clearly indicating the spare conductors should be made out on the standard form. A copy of this record will be left in the hands of the artillery engineer for each post. It is intended that this record shall serve the same purpose as the wire chief's record in telephone work and shall indicate to the artillery engineer the exact location and number of spare conductors in his fire-control system, as well as aiding in the routing of conductors when faults arise. But one copy of this record will be prepared for the use of the artillery engineer. Additional cards will be supplied him on requisition in case he desires to have duplicate copies made. Each copy supplied by the representative of the Signal Corps shall bear the initials of the officer or engineer under whose direction they were prepared. A second copy of this card will be forwarded to the Office of the Chief Signal Officer of the Army.

66. Method of procedure in turning over installations of fire control.—

(a) Upon completion of any Signal Corps installation, either temporary or permanent, the officer or engineer in charge of the work, accompanied by the Signal Corps storekeeper, will proceed with such artillery officer as may be designated to inspect and make a list of the property in each station or other separate unit of the installation. These will be made in duplicate, and the artillery officer will be asked to sign them as temporary memorandum receipts, one copy of which will be given to him and the other retained by the storekeeper.

(b) From these receipts the storekeeper will make up his invoices. Upon the regular receipts being accomplished the storekeeper will return these temporary memorandum receipts to the officer signing them.

(c) Cables will be transferred as follows:

First. The engineer in charge will prepare a set of maps showing the exact routing of each cable in the district, giving these cables the letter or numeral designations on the map as shown in approved scheme and including all branches. These maps are forwarded to the

electrical division of the Signal Office, Washington, where tracings will be made and a set of blueprints, in triplicate, will be returned.

Second. The engineer in charge will prepare a triplicate set of test sheets showing accurately the condition of all trunking cables, submarine and subterranean, as indicated by standard tests. Standard tests will not be required on battery branches extending from the cut-out cabinet to the various emplacements, etc., but the engineer must certify that they are operative.

Third. One copy of one each of the above maps and prints will be turned over to the noncommissioned officer in charge of the storeroom, who in turn will invoice these cables, referring in his invoices to these prints and records, which must accompany them. The invoices must indicate that the cable is "laid," must show the type and length of each cable with its designation, and must bear the certificate of the engineer in charge, as noted below.

The following example is given:

ARTILLERY ENGINEER,

District of Portland, Fort Williams,

at

Fort Preble.

Cable C. Laid from terminal box, primary station, to booth No. 1 (type No. 214), 350 feet

Cable No. 1. Laid from manhole foot of tower to House Island (type No. 24), 350 feet.

(See blue-print map of Fort Preble, No. 69; see blue-print map of Portland Harbor, No. 15.)

* * * * * *

JOHN BROWN,

Corp. Sig. Corps, in charge Signal Corps Storeroom.

Cables O. K. as per record submitted.

J. W. SMITH,

Asst. Electrical Engineer, Signal Corps.

(d) The engineer will turn over to the officer in charge of the installation the duplicate set of maps and records.

Article II.

DISBURSING REGULATIONS.

67. All disbursing officers of the Signal Corps and others who may make purchases or engage services by direction of a disbursing officer of the Signal Corps are enjoined to inform themselves of the Army Regulations concerning purchase of supplies and engagement of services, advertisement for proposals, awards, forms of agreement, contracts, etc. (See paragraphs 514 to 579, inclusive, Army Regulations.)

68. The following regulations, approved by the Secretary of War October 28, 1905, for the accountability of property purchased by disbursing officers of the Signal Corps and shipped direct from the contractor to other persons than the disbursing officer, will be effective January 1, 1906.

69. Contractors will be required to render bills in quadruplicate to the Signal Corps officer making the purchase on Signal Corps blank forms Nos. 28 and 29 (1905).

70. The two bills rendered on Form No. 28 will be held by the disbursing officer as the original and retained vouchers for settlement; the other two on Form No. 29 will be forwarded to the consignee, one of which he will sign as a receipt and return to the disbursing officer whose name appears in the brief thereon, retaining the other for his own reference and protection.

71. When first received by the disbursing officer, the four bills will be checked and examined and given a serial number. When the receipt copy (Form No. 29) is received back from the consignee and noted, it will be sent to the examining division of the Signal Office, where it can be checked against the "Abstract of articles purchased" from the disbursing officer and also checked against the "Return" and "Abstract of property received" of the consignee when they are received. The consignee will enter on his "Abstract of property received," accompanying his "Return" against all items so received, the serial number appearing on Form No. 29.

72. There will be added to the "Abstract of articles purchased" accompanying the monthly "Account current" a column in which will be entered the name of the person to whom the property is issued.

73. Disbursing officers will discontinue invoicing and taking receipts for Signal Corps property purchased and shipped direct from the contractor to other persons, as stated above, and that they also discontinue the rendering of "Property returns" for said property and the abstracts pertaining thereto.

74. When a disbursing officer purchases articles which remain in his possession, he will enter his own name in the "Abstract of articles purchased" as the person to whom said articles have been issued and will account for the same as heretofore.

75. Signal Corps property must always be taken up immediately upon receipt and be accounted for on the "Return" for the period in which received.

76. Strict adherence to the provisions of paragraph 697, Army Regulations, is enjoined upon all persons having Signal Corps property in their possession.

77. Attention is called to War Department circular, dated April 11, 1905, from which the following extract is published for the information and guidance of officers, civilian employees, and enlisted men of the Signal Corps: -

(a) Under no circumstances whatever shall any unclassified laborer be assigned to classified work.

(b) Laborers who, in connection with their usual duties, are to perform work of the grade performed by classified employees shall be appointed upon certificate by the Commission from appropriate registers of eligibles in the manner provided by the civil-service rules.

The Civil Service Commission, in letter to the Department dated April 6, 1905, states that "duties properly pertaining to the positions of messengers, clerks, and mechanical tradesmen, and duties requiring knowledge of reading, writing, or arithmetic for their general performance, are classified duties, as also are in general all duties requiring skill not usually possessed by the ordinary day-laborer."

78. Under the provisions of paragraph 556, Army Regulations, in the matter of contracts involving \$1,000 or less, which are made after proposals are invited and considered by a board of officers, whose recommendations have been approved by the Chief Signal Officer of the Army, or when open-market purchases are made by direction of the Chief Signal Officer of the Army, the disbursing officer of the Signal Corps at Washington, D. C., is authorized to make contracts for the purchase of supplies and for rendering services other than personal without the approval of the Chief Signal Officer of the Army in each case. Contracts exceeding \$1,000 will require the approval of the Chief Signal Officer of the Army after being duly signed by the contracting parties.

79. Except in Alaska or in the Philippines no expense will be incurred by anyone which is to be paid from Signal Corps appropriations unless the officer incurring the expense has funds in his possession to meet such expense or unless previous authority has been given by this office.

80. In cases of the greatest emergency officers should advise this office by telegraph stating the nature and amount of the expense necessary to be authorized, and, if approved, telegraphic authority will be issued. In asking for telegraphic authority it is desired when pos-

sible that the name and address of the party with whom the indebtedness is to be incurred, as well as the items of property or service to be performed, be given. Telegraphic authority issued by this office will be immediately confirmed by letter and will be serially numbered. In forwarding bills to this office the officer to whom the authority is issued will see that the order number contained in the formal authority is shown upon the face of bills. A certificate on the bills from such officer should show that the articles have been received, inspected, and accepted. In case they are forwarded by him to some other officer the name and address of such an officer, together with the date and manner of forwarding, must be shown. In addition to this certificate there must also be indorsed on the back of bills the method of purchase.

81. After once forwarding a set of bills to the Signal Office for settlement under no circumstances should an officer forward a duplicate set, unless requested to do so. If the original set of bills is returned to an officer by this office for correction and it is found necessary to secure a new set of bills in order to make the correction, the incorrect set should be marked "Canceled" and returned to the party rendering them to be destroyed.

82. At the beginning of each fiscal year the Chief Signal Officer of the Army issues annual authority covering certain expenditures to be incurred during the year. In some cases the funds for the payment of such expenditures are transferred to officers in order that they may make settlement direct. In case funds are not so transferred it is intended that bills shall be sent to the Signal Office for settlement.

83. Officers incurring expenses under this "annual authority," bills for which are to be sent to the Signal Office for settlement, are required to immediately furnish this office a copy of their purchase order. When such copy of purchase order is received at this office, it will be given a serial number in order that it may be placed upon the bills when forwarded to this office for settlement.

The purposes of these instructions are twofold.

(1) To obviate an expense being incurred for which no funds are available.

(2) To place this office in a position to check all accounts before settlement and preclude the possibility of duplicate or over payments.

84. Vouchers for services or supplies furnished by any Department or bureau to the Signal Corps or by the Signal Corps to any other Department, bureau, or office should be sent directly to the Treasury Department for settlement. Payments by one officer of the Government directly to another for services or supplies furnished by one Department, bureau, or office should, as a rule, not be made, but when made the amount received should be deposited to the credit of the proper appropriation, taking triplicate certificates of deposit for the same, one of which must accompany the voucher.

Article III.

DETAILED INSTRUCTIONS FOR DISBURSING OFFICERS.

85. Allotments from the appropriations for the Signal Corps are made by the Chief Signal Officer of the Army and warrants issued on the assistant treasurers of the United States usually in quarterly installments.

86. All disbursing officers of the Signal Corps are enjoined to familiarize themselves with provisions of the Army Regulations relating to money accountability, as set forth in paragraphs 580 to 660, inclusive.

87. Any disbursing officer of the Signal Corps who closes his money accountability for any reason should arrange for inspection of his accounts as prescribed in Army Regulations 910.

88. When Signal Corps funds are transferred and receipts therefor have not been received in time to forward with the account current, notation of this fact must be made and receipts forwarded as soon as received.

PROPOSALS, AWARDS, AND INSPECTION OF PROPERTY PURCHASED.

The following extracts from War Department orders dated October 6, 1905, will govern in the matter of proposals, awards, delivery, and inspection of property purchased:

89. Advertisements for supplies should contain the instruction to bidders who are not manufacturers of the goods called for to submit the name of the manufacturer from whom such goods are to be obtained, unless it be manifestly impracticable to furnish this information.

90. Lack of commercial standing on the part of the bidder or inadequate facilities or plant on the part of the manufacturer will constitute good and sufficient grounds for the rejection of bids. Abnormally low bids should be subjected to the strictest scrutiny and comparison with prevailing market rates.

91. All bids received from contractors who have failed unjustifiably to fill former contracts with the Government shall be rejected.

92. Careful investigation will be made of the financial status of individual bondsmen offering themselves as sureties on contractor's bonds and no bonds of individuals will be accepted until it is conclusively shown to the satisfaction of the contracting officer that such bonds afford ample security to the United States for the fulfillment of the undertaking in question.

93. Contracts once executed will be strictly construed and no variation from standards or specifications will be permitted or authorized. If it be demonstrated that contract requirements are unreasonable or that the prescribed tests are not practical or that for any reason the stipulation can not be rigidly applied or enforced, such contract must not be modified, but may be annulled with the approval of the Secretary of War, if for the best interests of the Government, and after again inviting competition from bidders, who are fully informed of the changed requirements, a new award and contract can be entered into. To sanction variation or to relax stringency in any particular of an existing contract is irregular and is likely to give the contractor an advantage which is unfair to competitors whose proposals were based on the expectation of being held to the strictest observance of the published requirements.

94. *Raw material* used by manufacturers in furnishing finished products will be as frequently inspected as the interests of the Government may require by inspectors especially qualified for such work, subject to frequent *personal* supervision by a commissioned officer.

95. All supplies furnished under contract or otherwise will be subjected, whenever practicable, to the personal inspection of a commissioned officer at the time of delivery; otherwise such inspections will be made by a civilian inspector under his personal supervision, subject to test and verification at irregular intervals and at unexpected times by such officer.

96. Commissioned officers charged with such inspections and with the supervision of civilian inspectors must qualify themselves by study, observation, and practice for such supervision as shall effectively protect the Government interests.

97. A detailed account of the proper procedure in the preparation of vouchers and payment of bills by disbursing officers is set forth in the following paragraphs:

BILLS FOR PURCHASES.

98. Creditors will be required to render bills against the United States on account of the Signal Corps promptly upon delivery of goods or termination of services.

99. Accounts for supplies and those for services must be made out separately, those for services being in duplicate on Form 28.

100. Bills for supplies will be made out in quadruplicate on Forms 28 and 29, the two on Form 29 to be held by the disbursing officer as the original and retained vouchers for settlement, the other two, on Form No. 29, to be forwarded to the consignee, one of which he will sign as a receipt and return to the disbursing officer whose name appears in the brief thereon, retaining the other for his own reference and protection.

101. Bills should, when practicable, be rendered in the English language; but if rendered in a foreign language a translation of the same must accompany the voucher.

102. Money amounts will ordinarily be expressed in terms of dollars and cents. If expressed in foreign currency, the total amount will be reduced to its equivalent in United States currency at the current rate of exchange at the date of payment.

103. The words "original" or "duplicate" should not be written or printed on any copy of bill.

104. Bills written with pencil, unless of an indelible character, will not be accepted.

105. Bills which show erasures will not be accepted unless the creditor makes a statement over his signature that the erasures were made before the bills were rendered.

The bills should be dated on or subsequent to the date of delivery.

106. Order and requisition numbers will be shown on bills for purposes of reference. Each purchase should be separately billed.

107. If the goods are delivered under verbal instructions or under written unnumbered orders, the date of such purchase and the name of the party making the purchase should be shown on bills.

108. For the purpose of uniformity and for checking bills against orders the articles should be billed exactly as described in the purchase order.

109. Abbreviations should not be made in the names of articles.

110. When more than one article of the same kind and quality is billed, the unit price must be shown—that is, the price each, per dozen, per 1,000, per foot, etc.

111. The discount must be deducted by the creditor from each separate item and not from the total of a group or total amount of the bill.

112. There should be indorsed on the face of the bills the name (or title) and address of the party (or company) to whom the delivery is made and to whom consigned. Example:

Delivered to depot quartermaster, New York, consigned to the Chief Signal Officer, Washington, D. C.

113. Creditors rendering bills must certify to the correctness thereof. The words "Certified correct" must be followed by the signature of the parties rendering the bill. (This certificate is printed on the receipt-blank of Form 28.)

SIGNATURES.

114. Signatures must in all cases agree with the name of the party in whose favor the account is rendered as shown by the bill-heads.

Examples as to proper manner of signing are given below.

115. Individuals will affix their autograph-signatures in ink. The autograph-signature of a duly-empowered attorney will be accepted

when an approved power of attorney has been filed with the disbursing officer paying the account. Example:

JOHN DOE,
By RICHARD ROE, *Attorney.*

116. Copartnerships should have the name of the firm stamped or written and be followed by the autographic signature of a member of the firm or other authorized person. Example:

JOHN DOE & COMPANY,
By RICHARD ROE, *a member of the firm.*

117. Incorporated companies should have the name of the company stamped or written, followed by the autographic signature of an authorized officer or person showing his official position. Example:

JOHN DOE & COMPANY,
By RICHARD ROE, *Treasurer.*

Companies' or trade names not incorporated should have the name of such company stamped or written, and followed by the autographic signature of the sole owner, sole proprietor, or other authorized person. Example:

THE JOHN DOE IRON WORKS,
By RICHARD ROE, *Sole Owner.*

BILLS FOR SERVICES.

118. In rendering bills for services, (persons employed by the hour, day, or month, see paragraph 119,) a compliance with paragraphs 98 to 107, inclusive, and 112 to 117, inclusive (where applicable), is required.

119. The officer or noncommissioned officer or other person under whom the services were performed will certify as follows on the face of the vouchers:

I certify that this account is correct, that these services have been fully and satisfactorily rendered, and that the person signing receipt in this voucher is authorized to do so.

120. Authority for the service must be shown on bills.

121. If the rate of pay is per hour, day, or month, the time and rate of pay should be stated and the total carried out in the proper place. Persons employed by the hour or day will be paid for the actual time.

122. Thirty days will be assumed as the length of the month without regard to the actual number of days in the month. (Does not apply to per diem employees.)

123. Bills for services must be worded as follows: "For services" (describe the service).

124. If the service is performed by the piece or by the job, paragraph 123 will be complied with, the words "for the job" added and the amount carried out in the proper column.

125. Bills for material used in performing service by the job will be disallowed. The price for the job, according to agreement, will include the cost of any material used.

VOUCHERS.

126. Blank vouchers (Form 28) should be furnished to creditors at the time purchase is made.

127. Vouchers will bear the account of the creditor as previously directed and nothing shall be written in the *receipt* thereof except the *amount due* and the *signatures* of the party to whom the money is due.

128. When first received by the disbursing officer, the four bills will be checked and examined and given a serial number. When the receipt copy (Form No. 29) is received back from the consignee and noted, it will be sent to the examining division of the Signal Office, where it can be checked against the "Abstract of purchase" from the disbursing officer and also checked against the "Return" and "Abstract of property received" of the consignee when they are received. The consignee will enter on his "Abstract of property received," accompanying his "Return" against all items so received, the serial number appearing on Form No. 29.

FREIGHT CHARGES.

129. The Signal Corps is not permitted by law to pay charges for freight, expressage, or postage. When the contract calls for delivery upon the part of the contractor, the charges must be prepaid. The contractor must render bills for the goods delivered and not show the transportation charges as a separate item. If the contract does not call for delivery on the part of the contractor, the shipment will be forwarded through the Quartermaster's Department on Government bill of lading.

BOXING OR PACKING.

130. In making contracts it should be understood that articles are to be boxed or packed and delivered free on board ready for shipment. Exception to this practice should only be made when additional boxing or packing to that stipulated in the contract is requested by the purchasing officer or in the case of shipments boxed for export forwarding.

EVIDENCE OF DELIVERY OF MATERIAL.

131. Contracts or orders made or issued by purchasing officers will specify how delivery shall be made.

132. Evidence of delivery of material should accompany all bills rendered by creditors. If shipment is delivered to the Quartermaster's Department for forwarding on Government bill of lading, the contractor should procure a receipt from the Quartermaster's Department and attach it to his bills when rendering them. Form 27 can be used for this purpose.

133. If shipment is to be delivered in the same city in which the contractor is located, he should procure a receipt from the party to whom

the articles are delivered. The receipt of such articles may be indicated on the face of the contractor's bills at the time delivery is made, or else a separate receipt should be obtained.

If contract calls for delivery to be made in another city from that in which the contractor is located, it will be the duty of such contractor to furnish a receipt from the transportation company.

Special instructions concerning delivery and taking receipts therefor should be issued by the purchasing officer, if the occasion demands.

MARKING SUPPLIES BY CONTRACTORS.

134. Contractors furnishing supplies will be required to mark and distinguish them with their names and with such other designations as shall be directed by the purchasing officer, or as shall be required by the specifications under which the purchase is made.

INSPECTIONS.

135. Disbursing officers should require that inspectors furnish them a written report of inspection, or have them indorse on face of bills of contractor: "Inspected and accepted." In cases where the inspection is made by the receiving officer the indorsement or certificate should read "Received, inspected, and accepted." These indorsements should be officially signed by the inspector.

136. At the time the purchase is made the purchasing officer should arrange for the inspection, so that the accounts of the contractor can be certified by the inspector immediately upon completion of the inspection and while he is at the factory or place of business of the contractor, if it is intended to have certificate of inspection indorsed on bills.

137. Purchasing officers should so arrange for inspections that bills of contractors will not be delayed in settlement. For instance, if an article is manufactured in the East to be shipped to some point in the West and the bid of the manufacturer specifies delivery free on board at his factory the articles will be considered delivered, so far as the contractor is concerned, when evidence is produced that they have been turned over to the transportation company to be forwarded on Government bill of lading. The bill of the contractor should therefore not be held for payment until the arrival of the shipment at destination.

TIME OF DELIVERY.

138. Contractors can not be penalized for delay in delivery. Advertisements for proposals should not, therefore, specify that a certain percentage will be deducted for each and every day's delay after a given date. It is desired, however, to require contractors to live up to their time of delivery. The advertisement entered into should specify

that for deliveries made after the time stated in the proposal of the successful bidder the rate per unit will be one-tenth of 1 per cent. less than the original amount for the first thirty days, two-tenths of 1 per cent. for next thirty days, and the same ratio continued until final and complete delivery has been made, or other such rate as will properly protect the interests of the United States.

If the time of delivery is not of sufficient importance to require the stipulations of different rates of payment for delayed deliveries and the contractor fails to make delivery in the time specified in his proposal, it should be noted on his bills that the United States suffered no pecuniary loss by reason of such delay in delivery.

Contractors can not be held accountable for delays occasioned by agents of the United States.

PAYMENT OF BILLS.

139. When accounts are presented for settlement, disbursing officers should see that the preceding requirements have been complied with.

The bills should be checked against the retained copy of the purchase order to see that the quantity, description of articles, and the unit prices are correct. The extensions and totals should be fully and carefully checked to see that they are correct.

Examination should be made to see that a creditor has signed the receipts to the vouchers in a correct manner.

The signature in the receipt should correspond with the name of the party rendering the bill.

The authority for the expenditure should in all cases be stated on the voucher.

The method of purchase in accordance with paragraph 640, Army Regulations, 1904, should be inserted.

140. Open-market purchases, when the aggregate amount is under \$200, are permitted in the manner common among business men; that is, by obtaining quotations from dealers in the class of supplies needed. Explanation of this method of purchase can be expressed as follows: "Procured in open market in the manner common among business men."

141. In cases of open-market purchases exceeding \$200 and made on account of emergency the following explanation is sufficient: "Procured in open market at the lowest obtainable rate, the public exigencies requiring immediate performance of the work or the service."

142. If a purchase is made in the open market from the patentee or sole manufacturer, or where competition is impracticable, in explanation of the open-market purchase, the following words of like import should be used: "Procured in the open market from the sole manu-

facturer." The discretion of the disbursing officer will be exercised as to the propriety of the explanation to be made.

143. Where purchases are made after inviting bids, the method of purchase should be explained as follows:

Under public notice of — days or more and sealed proposals opened ——— 19—.

If the conditions of the proposals permit of purchase of additional quantities, subsequent vouchers should bear the explanation:

Bids attached to voucher No. ———, Abstract ——— month of ——— 190—, appropriation ——— fiscal year 190—.

If the time of delivery under bids is such that a formal contract is necessary, the method of purchase can be stated as follows:

Under contract dated ———, 19—.

If the time of delivery under bids is such that a contract is not necessary, one copy of each bid received, together with an abstract of all of the bids, should be attached to the copy of the voucher intended for the auditor. The retained voucher of the disbursing officer should have attached one copy of each of the bids received, together with an abstract.

144. The quantity of supplies which are to be purchased under bids must be stated in the advertisement for the proposals, and disbursing officers should be careful to see that a quantity in excess of that specified is not purchased.

145. The title of the appropriation should be stamped on the voucher in the proper place.

146. The name and rank of the disbursing officer making payment should be entered in the receipts to the vouchers, as well as the station at which the disbursing officer is located, and the station of the Assistant Treasurer of the United States or government depository upon whom the check in settlement is drawn.

147. The justness and correctness of the account should be certified by the disbursing officer on the voucher in the place provided for such certificate.

148. The disbursing officer will, of course, require a like certificate to him in case he has not personal knowledge of the services from some other officer, or fully authorized person having personal knowledge of such performance.

149. In making out checks the name of the person, company, or corporation to whom the check is drawn should be the same as the name of the creditor, as shown by the bill-head and receipt to the voucher.

150. There should be stated in the proper place in the lower left-hand corner of the check the purpose for which the check is drawn, as

Services Oct. 1905

or

Electrical supplies.

If possible, the check should be protected by perforation or other suitable methods showing the number of dollars only.

151. In mailing checks to a creditor it is advisable to inclose a statement showing what bills are being paid by check inclosed.

Form No. 19, which is a statement of this character, has a receipt attached in which the check number can be inserted to be signed and returned to the disbursing officer by the creditor receiving it.

152. When all payments are made, disbursing officers should enter in their cashbook the amount expended under each appropriation. The cashbook should then be balanced.

After checks are drawn, the date of payment should be entered in the proper place in the receipt to the voucher and in the brief on the back of the voucher. The number and date of check is entered in the proper place in the receipt to the voucher.

153. Vouchers should all be numbered consecutively, beginning with the last previously used. These numbers should have the suffix "A" for purchases and "B" for services.

154. At the end of each month the disbursing officer's cashbook should be balanced and the balance of the several appropriations carried to the next month's account.

155. An abstract of expenditure (Form 6 or 7, 1905) should be made in duplicate, showing the date of payment, voucher number, name of creditor, and amount of bill.

156. An account current (Form No. 10 or 11, 1905) should also be made in duplicate showing the amount of money on hand at the first of the month, the amounts received during the month and from what source, the amounts disbursed, transferred, etc., each under their respective appropriations heading, and the balance carried to the next month's account. Separate accounts-current for each appropriation should *not* be made.

157. An abstract of articles purchased (Form 9, 1905) should be made in duplicate. The articles purchased should be listed alphabetically from the original bills, showing the quantity, article, voucher number, date paid, from whom purchased, and to whom the articles have been issued.

158. The articles purchased should be divided into five classes:

1. General supplies.
2. Automobiles and automobile supplies.
3. Bicycles and bicycle supplies.
4. Books.
5. Photographic supplies and equipment.

159. A similar abstract of articles (Form No. 8, 1905) will be made for articles purchased for immediate expenditure. This abstract must be approved by the Chief Signal Officer of the Army or by the chief signal officer of a department.

160. When a disbursing officer purchases articles which remain in his possession, he will enter his own name in the "Abstract of purchases" as the person to whom said articles have been issued and will account for the same on a return as heretofore.

161. The original copies of each abstract should be compared with the original bills to see that they are correct. All abstracts should be certified by the disbursing officer as follows:

I certify that the foregoing abstract is correct.

162. All open-market purchases made during the month must be reported. Purchases exceeding \$200 should be reported on Form No. 24, 1905. Purchases not exceeding \$200 should be reported on Form 25, 1905.

163. The accounts current with the vouchers and abstracts pertaining thereto will be transmitted to the Chief Signal Officer of the Army, Washington, D. C., not later than the tenth day of the month following the one for which they are rendered. The duplicate copies of all of these documents are retained by the disbursing officer.

164. All correspondence relating to bills and vouchers should be filed with the retained copy of the disbursing officer's accounts. They are not required by the auditor.

165. Disbursing officers should keep an alphabetical card record of all payments made, showing the purchase order number, the date of bill, the date paid, the bill or voucher number, the check number and the amount.

This information should be entered on the cards at the end of each month immediately after all reports are completed and forwarded and before other payments are made. This record will be found convenient for the purpose of obtaining information requiring the payment of any bill.

166. Pay rolls in the District of Columbia require special certificates, which are quoted in War Department Circular No. 98 of September 21, 1905.

167. Payments by currency will be made in accordance with paragraph 646, Army Regulations.

168. The Auditor requires a letter of transmittal for all papers, accounts current, corrected vouchers, etc., notwithstanding paragraph 778, Army Regulations.

169. If vouchers are suspended by the Auditor, the disbursing officer will be notified by the Auditor direct, and he must refer to his retained vouchers and make explanation direct to the Auditor. No vouchers of disbursing officers are retained in the office of the Chief Signal Officer of the Army.

170. Signal Corps property must always be taken up immediately upon receipt and be accounted for on the "Return" for the period in which received.

Strict adherence to the provisions of paragraph 697, Army Regulations, is enjoined upon all having Signal Corps property in their possession.

171. Signal officers who pay rent for buildings must transmit a copy of a formal contract with the first voucher pertaining to such payment, or credit for such payment can not be given.

172. Officers of the Signal Corps having in their possession United States checkbooks should at least once each week examine the unused checks. Officers should assure themselves of the integrity of the unused checks *personally* and not through subordinates.

RECEIPTS FROM TELEGRAPH LINES.

173. An act making appropriations for sundry civil expenses of the Government for the fiscal year ending June 30, 1884, and for other purposes.

* * * * * * *

PAR. 3. That on and after the first day of July, eighteen hundred and eighty-three, all moneys received for the transmission of private dispatches over any and all telegraph lines owned or operated by the United States shall be paid into the Treasury of the United States, as required by section thirty-six hundred and seventeen of the Revised Statutes, and all acts or parts of acts inconsistent herewith are hereby repealed.

174. Complete instructions for accounting for line receipts from the military telegraph lines can be found in Signal Corps Manual No. 2.

Article IV.

PROPERTY ACCOUNTABILITY AND RESPONSIBILITY.

GENERAL PROVISIONS.

175. The general regulations prescribing property responsibility and accountability in the Army and the proper procedure when articles are lost or damaged is set forth in paragraphs 661 to 707 of the Army Regulations.

176. The various manuals of the Signal Corps need not be accounted for on property returns.

177. The Chief Signal Officer of the Army distributes Signal Corps Manuals only to the officers, enlisted men, and civilian employees of the Signal Corps. Other branches of the service are supplied by the second division of the General Staff when applications through military channels are referred approved.

178. Blank forms of the Signal Corps when sent out by property depots should not be invoiced or accounted for.

PROPERTY DAMAGED, LOST, OR DESTROYED, ETC.

179. Property which has become unserviceable by reason of fair wear and tear in service should be preserved until there is an opportunity to place it before an inspector. Property damaged other than by fair wear and tear in service can not be placed before an inspector without first having been surveyed. The proper procedure to obtain a survey or to place articles before an inspector is set forth in the Army Regulations, paragraphs 713 to 729 and paragraphs 912 to 917.

180. In case of articles damaged in transportation, proceed as prescribed in paragraph 1147, Army Regulations.

181. Telescopes, field glasses, telephones, and expensive electrical apparatus of the Signal Corps when unserviceable will not be submitted to an inspector for condemnation without previous authority of the Chief Signal Officer of the Army. Whenever such instruments are unserviceable, the report of the matter should be made to the chief signal officer of the department, stating the nature of the unserviceability and whether the article can be repaired in the vicinity of the post, and the probable cost of repairing. The chief signal officer of the department will then act in the matter or forward the communication to the Chief Signal Officer of the Army with recommendation as the case may warrant.

EXPENDABLE PROPERTY.

182. All articles of Signal Corps property enumerated in the classifications below, when received must be accounted for on property return, but *when consumed* may be dropped upon proper certificate of expenditure. (Form No. 55-1905.)

These certificates of expenditure will be accepted as proper vouchers *only when the articles have actually been consumed* and the voucher approved, as provided in other paragraphs.

Classifications as follows:

- Insulating and splicing materials.
- Outside line material when used in repairs.
- Inside wiring material.
- Photographic chemicals, papers, plates, and films.
- Articles of stationery, except steel erasers, ink-wells, mucilage-cups, and rulers.
- Dry batteries and renewals for batteries of any type when installed.
- Spare parts for any instrument or machine when installed or used in repairs.
- Articles such as oils, soap, acids, paint, etc., which it is evident are supplied to be consumed.
- Cable when used for inside wiring.
- Molding, hinges, hasps, locks, etc., when installed as part of permanent fixtures
- D. S. Sounding shots and glass tubes for Thompson machine.
- Hacksaw-blades, nails, screws, etc.

183. Battery cells and jars, connectors, push-buttons, etc., when taken from reserve and placed in a circuit are not considered as expended, as they are then merely performing the purpose for which they were furnished, and they will not be dropped from returns unless broken or absolutely unserviceable.

184. Poles, wire, insulators, and other telegraph-line material when used in the construction of a line may be dropped; but such line must in all cases appear on the return in miles and fractions or in feet. When the line is shortened or taken down, the material recovered must be again taken up and accounted for.

185. Articles (whether expendable or unexpendable) lost or stolen must not be entered on certificate of expenditure, but should be covered by a special certificate (Form 56-1905) setting forth the facts in the case, and when the aggregate money value of the articles lost or stolen exceeds \$5 must be submitted for the action of a survey.

186. Station record books, such as letters sent, copying, check-ledgers, etc., as soon as they are opened and put to use, can be dropped from property returns on certificate of expenditure as "used in service."

187. Enlisted men of the Signal Corps serving at military posts before forwarding their property returns will have certificate of expenditure approved by post commander; those not on duty at military posts and accountable for property will forward the certificate to the

department chief signal officer for approval in season, so that it can be returned in time to be included with the return when rendered.

188. Cable ends.—All pieces of lead pipe cut off from lead-covered cable ends in construction work will be saved. These pieces will be turned in to the Signal Corps storekeeper in the district. Upon completion of the fire control installation this junk lead will be taken up on the papers of the storekeeper and invoiced by weight, to the district artillery engineer with other Signal Corps property. The report of the civilian engineer or assistant in charge of the work should show the amount of junk lead thus turned in.

PROPERTY ACCOUNTABILITY.

189. Until otherwise directed by the Secretary of War, property returns are to be made on the 31st day of December and on the 30th of June of each year, and all returns for Signal Corps property begin and end at those times, except where, in the cases of officers, enlisted men, or others responsible for property by reason of transfer, change of station, or leaving the service, it becomes necessary to close their accountability at an earlier date. A return, with all its accompanying papers, must be forwarded direct to the office of the Chief Signal Officer, Washington, D. C., within twenty days after the termination of the accounting period. State militia returns rendered December 31, only.

All persons accountable for property are held personally responsible and should render only ONE return to include all property received and transferred at any station during the period. The rendering of a separate return for articles in personal possession is not desired.

190. When an enlisted man has, by a court-martial, been convicted of losing or damaging public property, the officer accountable for the property will send with his property return a certified copy of so much of the court-martial order as refers to the case, giving number, date, and place of issue of the order and stating on the face of said copy the rolls on which the charges are made.

191. Should an officer or agent of the Government charged with public property fail to render the prescribed returns thereof within a reasonable time, a settlement of his accounts will be made by the proper bureau of the War Department, and the money value of the property with which he is charged will be reported against him for stoppage.

192. Enlisted men of the Signal Corps at military posts becoming responsible for public property when stores or supplies shipped to them are received in unserviceable condition, or when deficient in number and quality, shall examine them in the presence of witnesses, as per paragraph 673, Army Regulations. In case of damage or deficiency appearing, they will then apply in writing to their immediate com-

manding officer for survey to determine the responsibility for injury or loss occurring. Enlisted men of the Signal Corps serving alone at isolated stations will, under similar circumstances, make immediate report in detail of the facts to their immediate commanding officers and ask that appropriate action may be taken.

193. In case of officers serving within the limits of the United States where the value of Signal Corps property lost, stolen, or destroyed involved does not exceed \$5, the certificate setting forth the facts in the case may be approved by the commanding officer under whom the responsible officer is serving. In all other cases the certificate will be forwarded to the Chief Signal Officer of the Army for action prior to being filed as a voucher to property returns.

194. When any article of public property not of an expendable nature, for which any officer or other person is responsible, becomes unfit for service from any cause whatever and is not worth expense of repair, he will report the facts in the case and submit the articles for action to the inspector first visiting the station, excepting telescopes, field glasses, heliographs, and telephones (see paragraph 1598, Army Regulations). A copy of the inventory and inspection report must accompany the return rendered to the Chief Signal Officer on which the property is accounted for.

195. An officer or other person whom a survey officer or other competent authority has adjudged responsible for the loss, destruction, or shortage of any article or parts of articles of Signal Corps property will be required to cover the money value thereof into the United States Treasury before a clearance will be furnished. This may be done either by forwarding the money to the disbursing officer of the Signal Corps, Washington, D. C., who will deposit the money on account of the responsible officer, or the money may be deposited in some Government depository to the credit of "Miscellaneous receipts, refundment for — (lost) ——— property, Signal Service of the Army, 190—" (giving year in which the fiscal year ends). In the latter case an account current must be rendered to this office for examination and transmission to the accounting officers of the Treasury Department.

196. Officers of the Army detailed for duty at military colleges who are accountable for Signal Corps property that has become unserviceable are authorized to submit the same for the action of an inspector.

197. Telephones and transmitters on life rental from the American Bell Telephone Company will, when unserviceable, be sent in numbers of not less than six through the Quartermaster's Department to the American Bell Telephone Company, care of the Western Electric Company, No. 463 West street, New York City, notification of the numbers of instruments and the dates of shipment being furnished to the Chief Signal Officer of the Army.

198. When it is found that any article of Signal Corps property is unserviceable, but worth the expense of repair, a detailed report will be made of the nature of the unserviceability of the article, with an estimate of the cost of repair, and whether or not said repairs can be made at or near the station or post.

199. When an inspector recommends that certain articles of Signal Corps property be turned into a depot for repairs, the accountable officer will report such fact to the department chief signal officer and await instructions as to the disposition of the same.

200. Whenever instructions are given for sending unserviceable property to the depots of the Signal Corps for repairs, it must be transferred by invoice and receipt in the regular way.

201. The act of June 8, 1896, authorizing the payment of expenses "as approved by the accounting officers of the Treasury" incurred in the sale of old material, etc., from the gross proceeds thereof, and the payment into the Treasury of the net proceeds only, does not require that such expenses shall be so approved before payment, but simply that an itemized account thereof shall be rendered to the accounting officers for settlement as any other item of expenditure of Government funds. (Davis, par. 616, of 1901.)

202. When necessary to employ a civilian auctioneer for the sale of public property, the officer, when practicable, will determine, before employment, the amount he shall be paid for the service. This should be reasonable. In case of fees the percentage should be that usually obtained in that locality, and under this form of payment the auctioneer should bear all the expenses of advertisement.

For ordinary sales the services of a clerk or employee should be utilized as auctioneer without expense to the Government.

203. Transfer of any article of Government property will not be made from one office to another without specific authority from the proper officer; nor will articles of Government property be sold or otherwise disposed of, except as provided by regulations of the service and specific instructions from proper authority.

204. Public property and labor hired for public use will not be perverted to any use whatsoever not authorized by the regulations of the service.

205. Articles of like name but of different pattern will not be combined. Thus, 20-ohm, 4-ohm, and main-line sounders must not be carried as so many "sounders," but the total of each will be carried under its appropriate heading.

206. The official numbers of field glasses, telescopes, telephones, and transmitters and other instruments having serial numbers must in all cases be given on the returns, invoices, and receipts. The record of serial numbers will be kept in the examining division of the Signal Office in Washington.

207. All articles on Signal Corps property returns must be arranged in alphabetical order. Photographic supplies, bicycles, and parts for same, typewriters, and parts for same, telephones, and parts for same, etc., should be included in alphabetical order and not under subheadings.

208. When any person accountable for Signal Corps property is relieved from the charge of the same, he will turn over to his successor all property and stores for which he is officially accountable and will take duplicate receipts therefor on the forms furnished for the purpose, one copy of which he will inclose as a voucher to his final return of property and the other will be retained. The final property return will be made out in precisely the same manner as the regular semi-annual report. In cases in which complete transfer of property occurs, instead of exchanging separate invoices and receipts, as above provided, the receiving officer may make direct entry on the final return (both original and duplicate) of his predecessor that all the property thereon enumerated as on hand and transferred to successor was received by him. The transferring officer may make similar entry on the return of his successor, stating that all the stores there taken up as received from such predecessor were actually turned over by him.

209. The retained return, showing accountability for property, pertains to the person making it, and will not be considered a part of the records at the station where the officer or man is serving.

210. When it is not possible to render a return within the limits of time prescribed, owing to the nonreceipt of certain vouchers, the return itself must not be held, but will be mailed to the Chief Signal Officer, with a letter stating what vouchers are missing, with reason therefor, said missing vouchers to be forwarded later when received.

211. The person signing a receipt for Signal Corps property received by him should satisfy himself that the condition of the articles is correctly stated thereon; otherwise he may become accountable for un-serviceable condition or shortage of component parts of articles transferred to him. Receipts should be returned to the issuing officer, if correct, within ten days from the date the property was received.

212. Officers and others accountable must verify returns by an actual count of all the articles on hand at the time the return is made.

213. All property received must be taken up on the returns, whether invoiced or not, except forms and stationery. Should any article of property be received, either by purchase or otherwise, and not included in invoices, special attention should be called to said fact by letter. The articles should be taken up on separate abstract, showing that they were taken up without invoices. It may happen in some cases that invoices of articles sent are received, while the articles themselves may not have been received. In such a case the articles should not be taken up until they are actually received; otherwise the person doing so will make himself responsible for such articles, while they may never

reach him. A special report by letter should be made of all articles not received within a reasonable time after the person to whom sent is notified of their shipment.

214. Where there is a local telegraph or telephone line at the post, its length in miles or feet must be given on the return under the heading "Line;" otherwise telegraph material or supplies will not be furnished, or certificate of expenditure dropping such supplies as used will not be accepted on the assumption that there is no line at the post.

215. To save time and space, a few articles of Signal Corps property are invoiced as "complete." Officers, enlisted men of the Signal Corps, and other persons receiving such articles should satisfy themselves that all the parts which go to make up the whole are present before signing receipt therefor. When any parts are missing, a memorandum should be made on the receipt specifically designating such parts as are missing. The accountable officer will then be held responsible for the shortage.

216. Officers in charge of military telegraph lines will account for all property at their stations and for all sections of line (in miles) radiating therefrom. They will designate the several repair sections on the lines under their charge, and the enlisted men or civilian operators in charge of such repair sections will account for all property at their stations.

217. When an officer, enlisted man, or other employee having Signal Corps property in his possession or being accountable therefor leaves the service of the United States, final payment will not be made to such officer, enlisted man, or other employee until full and satisfactory evidence is furnished that the property with which he may have been intrusted has been duly accounted for.

218. In order to reduce to a minimum the clerical work at the office of the Chief Signal Officer incident to the examination of property returns, the post signal officer shall be accountable for all Signal Corps property at a military post or station. Should another officer desire to retain certain articles of Signal Corps property for official use, he may be authorized to obtain them from the signal officer on memorandum receipt. These instructions, however, do not apply to chief signal officers of departments, to enlisted men of the Signal Corps on duty at stations where there is a military telegraph office, or to the visual signal outfits issued to company commanders.

219. Letters of transmittal are not required in forwarding property returns unless there is some particular fact relative to the papers to which it is desired to specially invite attention.

220. All transmitters and receivers furnished by the American Bell Telephone Company to this service are their property, and are held by the Signal Corps under life rental upon the following conditions:

For use of the United States Signal Service only, and not to be used in connection with lines, instruments, or service of other parties.

From the above it will be seen that such instruments must not be used in connection with commercial telephone exchanges or in any manner switched onto lines not distinctly Government lines.

Rented telephone receivers and transmitters will be carried on property returns in red ink, in order to distinguish them from those which are owned by the Government.

EXAMINATION OF PROPERTY RETURNS.

221. Where errors are found during the examination of property returns at the office of the Chief Signal Officer, the accountable officer will be immediately notified thereof, and, where practicable, subsequent correspondence will be by indorsement on the original communication. In connection with discrepancies, corrected returns will not be rendered unless specially called for, as a corrected return necessitates the re-examination and checking of each item on the new return.

222. Property returns rendered in the Philippine Islands by civilian employees and enlisted men of the Signal Corps will receive final examination in the office of the chief signal officer, Philippine Division, and after settlement will be filed in that office. The property returns of all officers, however, except the property officer at Manila, will be checked against the others in the division and forwarded to the office of the Chief Signal Officer of the Army. The return of the property officer at Manila can be held until all property issued to civilian employees or enlisted men throughout the division is checked; but in order that the examination of property returns at the office of the Chief Signal Officer of the Army is not delayed a memorandum abstract, showing the property transferred to and from officers in the United States, will be forwarded to the Chief Signal Officer of the Army.

The accounting for Signal Corps property, as examined in the office of the chief signal officer, Philippine Division, will be regarded as a clearance of accountability only for such items as have been taken up and properly accounted for. (Approved by Secretary of War January 6, 1906.)

223. In adjusting accounts pertaining to Signal Corps property no notice will be taken of omissions or errors where the money value thereof does not exceed 25 cents. This ruling is to save expense attending correspondence, etc.

Article V.

CIVILIAN EMPLOYEES.

GENERAL PROVISIONS.

224. The general regulations concerning appointment, promotion, dismissal, the payment, traveling expenses, etc., of all civilian employees of the War Department are set forth in article 57, paragraph 730 to 742 of the Army Regulations.

225. Whenever it is necessary to employ civilian assistants—either splicers, wiremen, linemen, or laborers—for a period not to exceed twenty-six working days, authority may be granted immediately by the Chief Signal Officer of the Army upon receipt of a request from the officer or civilian in charge of any installation where the labor is needed.

Where such employment is required for a period approximating one month, or for a period exceeding one month, it is necessary for authority to be obtained from the Civil Service Commission, with the certification of eligibles from the rolls of that body. This latter procedure necessarily requires not less than two weeks time.

When it is found that temporary help must be employed, the assistant should prepare a letter, or telegram if necessary, indicating clearly the necessity for the assistance, the rate of pay, the date employment will begin, the probable length of time it will be required, and the name of the party employed.

When this information has been forwarded, if it is approved by the Chief Signal Officer of the Army, no delays will occur in authorizing such employment.

226. The Chief Signal Officer should be notified immediately upon the cessation of the term of services of any employee whether on temporary or regular roll.

227. Under no condition should employment be made except with the authority indicated in the preceding paragraphs.

228. On June 30 and December 31 of each year every signal officer will submit a confidential report to the Chief Signal Officer of the Army covering the general efficiency, habits, attendance, etc., of each civilian employee of the Signal Corps serving under his supervision, stating whether or not he should be continued and giving such other information as will serve to determine his fitness for the position he holds.

TRAVELING EXPENSES.

229. The attention of the civilian employees of the Signal Corps is called to the propriety and necessity of exercising strict economy in expenses incurred on journeys under orders. No employee should impose on the United States a greater expense than he would incur if traveling on his own business. Extraordinary and unusual expenses will be noted against the records of employees unless such are accompanied by evidence of imperative necessity. Usually his station will be changed when an employee is to be on duty a month or more at any one point.

230. Accounts covering expenses of civilian employees, Signal Service at large, will be rendered at the end of each month.

231. The Quartermaster General has ruled that hereafter Form 13½, (Quartermaster's Department,) accompanying expense accounts, must be made out in *ink*. They will not be accepted if filled out on the *typewriter*.

232. *Expense accounts.*—The attention of all civilian employees of the Signal Corps is invited to the following important rulings concerning expense accounts:

(a) The allowance of \$3 per diem for traveling expenses en route to or from stations provides \$1 per meal. If an employee leaves his station between the hours of 3 and 8 p. m., the allowance for meals that day would be \$1. Similarly, for breakfast and lunch. Care should be taken, therefore, to keep traveling expenses within these limits.

(b) It is held that under no circumstances is an employee privileged to pay a rate which might be construed to be higher than the rate usually paid for like accommodations.

(c) It is held that expenses incurred under such circumstances as to appear to be of advantage to persons other than the employee signing the voucher are irregular and contrary to the law.

233. When ordered to temporary duty, each civilian employee is allowed his *actual* expenses to an amount not exceeding three dollars (\$3) per diem.

In order to insure prompt reimbursement of this money, the following points must be noted:

1. Receipts are required for running expenses in all cases where the length of stay in one place exceeds one day. Receipts are invariably required for lodging.

2. The account must be so made out that it shows clearly the expenses for each day, since the allowance is literally \$3 for each day, and any amount in excess for any one day will not be reimbursed, even though the total expenses for the trip do not average \$3 per diem.

3. The account must be made on blanks and forms as shown in Engineering Circular A-2, with all certifications, etc., appearing thereon.

The expenses are reimbursed by the Quartermaster's Department and should in all cases be requested paid through the Signal Officer under whom they are incurred.

234. When traveling to change station for any duty which requires *the use of tool-chests* or instrument-cases on arrival and there is not

sufficient time to ship by freight, apply to the chief signal officer of the department requesting the authority of the chief quartermaster of the department for shipment by express. If the travel order authorizes such shipment by express, no application is necessary. When proper authority has been obtained, the Quartermaster's Department will ship by express on Government bill of lading.

ELECTRICAL ENGINEERS AND ASSISTANTS.

235. Electrical engineers, assistant electrical engineers, draftsmen, electrical assistants, and electrical-instrument makers employed by the Signal Corps will form a special force attached to the electrical division of the Signal Office. Their duties will be performed under the direction of the chief of the electrical division unless otherwise specially ordered by the Chief Signal Officer of the Army. They will report in writing to the Chief Signal Officer of the Army at the end of each month their permanent station, station where on duty, duties performed, date of leaving, and date of return to temporary or permanent station. All reports will be addressed direct to the Chief Signal Officer of the Army unless they are made under assignment to special duty under a designated officer of the Signal Corps.

236. Whenever a signal officer is charged with such technical duties as require for a definite time the entire services of an electrical engineer or other of the force above named, the employee will be assigned to duty for a definite period with the designated officer. When these employees are acting under the immediate orders of a signal officer, they will from time to time file such reports with that officer as may be prescribed by him.

237. When regularly stationed in Washington or at any headquarters, these employees will in all cases register in a book provided for that purpose dates of departure and return.

238. Assistant electrical engineers, or electrical assistants, in charge of Signal Corps work must promptly notify the electrical division of the date any employee of the Signal Corps at large (civil service) reports to him for duty; also the date of departure from the district or termination of the services of such employee.

239. The senior engineer, or electrical assistant acting as such, in each artillery district will cause *all vouchers for services* to be turned in to him several days before the period at which they must be forwarded to the officer in charge of the installation for certification. The engineer in charge will inclose them with a letter naming the vouchers and adding that he has examined the same and that the services have been rendered as stated.

240. Allowance should be made for delays in shipments, as well as the time required for requisitions to go through proper channels, and under no conditions should there be less than one month's supplies in the main storeroom.

241. Property issued to each assistant on regular invoices is usually preceded by a quartermaster's notice of shipment, which requires no action, and should be followed in a reasonable time with duplicate invoices signed by the issuing officer and duplicate receipts, which latter should be signed and returned to the officer whose name they bear.

When property is transferred by an assistant to authorized parties, similar invoices should be used, with accompanying receipts.

On January 1 and July 1 one copy of each invoice and receipt, abstracted as shown in engineering circular A-2, is forwarded to the Chief Signal Officer.

242. Each assistant acting as overseer of construction shall report weekly to the signal officer under whose direction the work is being done.

243. Each assistant shall send to the Chief Signal Officer, at the end of each month, a personal report on Form 210—1905.

244. All matters pertaining to the work of installation or to matters of policy must be transacted through the signal officer to whom the assistant reports.

PERSONAL EQUIPMENT, CONSTRUCTION SUPPLIES, PROPERTY PAPERS, AND REPORTS.

245. Each assistant electrical engineer and electrical assistant should have the following tools and supplies, for which he is personally responsible:

- 1 electrical engineer's tool-chest.
- 1 empty service tool-bag.
- 1 Weston voltmeter.
- 1 voltammeter.
- 1 copy Supplee's Mechanical Engineer's Reference book.
- 1 copy each Signal Corps Manual.
- 1 copy each Signal Corps Memorandum.
- 1 binder for engineering circulars.
- 1 binder for blue prints.
- Typewriters are issued when needed.

Electrical instruments for cable testing are kept at department headquarters and are issued on memorandum receipt during the time they are actually in use. When the testing is completed, these instruments should be shipped back to headquarters.

246. The tools listed under personal equipment are intended to be kept in the possession of the assistant during his service in the Signal Corps and all special or construction tools needed on work with which he is connected, as well as all tools used by enlisted men or temporary employees, will be furnished by the Signal Corps storekeeper as required.

247. When acting in the capacity of overseer, either for a post or district, the assistant will be expected to check the condition of all storehouses and tool chests, both as to care taken with the equipment and as to the need for renewal.

MISCELLANEOUS.

248. Civilian employees of the Army are authorized to purchase certain articles of clothing and fuel from the Quartermaster's Department (A. R., 106) and subsistence supplies (A. R., 1271) under a certain condition set forth in these paragraphs.

249. Civilian employees at military posts are entitled to medical attendance under such regulations as the Surgeon-General may establish. (See paragraph 1485, Army Regulations.)

250. When it is absolutely necessary that a telegram be sent, a blank form (Quartermaster's Department Form 87) should be procured through the post adjutant, the telegram signed by the assistant, countersigned by an army officer, and then presented to any telegraph office for transmission. Care should be taken to make telegrams clear and brief. The name of the telegraph company must be entered on the blank. The blanks are always to be had at army posts.

251. In case orders are received from any officers at artillery posts which are apparently improper or in conflict with the employee's orders or instructions, the proper procedure is to obey promptly and then report the matter immediately to the signal officer under whom they are serving, such report to be by telegraph only in extraordinary cases. However, it is desired that all employees use great care to avoid friction in their relations with officers.

252. Electrical engineers and other technical employees of the Signal Corps while serving on transports or other Government vessels used as cable ships are entitled to subsistence in the same manner as employees of the Quartermaster's and Commissary departments serving thereon.

Article VI.

REQUISITIONS AND SUPPLY OF PROPERTY.

REQUISITIONS.

253. Requisitions for all Signal Corps equipments and supplies or fire control material for maintenance, will be rendered in duplicate and forwarded to the Chief Signal Officer of the Army through the chief signal officer of the department, who will endorse a recommendation concerning the issue. In the Philippines Division the supply of property will be controlled by the chief signal officer, Philippines Division, and requisitions not forwarded to the Chief Signal Officer of the Army. In the Department of the Columbia, requisitions from Alaskan stations and telegraph and cable office supplies will be issued by the Chief Signal Officer, Department of the Columbia, from the stores in that department without reference to the Chief Signal Officer of the Army. Requisitions for post telephone or fire control material, however, in that department will be forwarded to the Chief Signal Officer of the Army.

Upon receipt of requisitions at the Signal Office, Washington, a serial number is assigned by the electrical division and one of the duplicate copies immediately filed. Notation of action taken and correspondence relative to each requisition is kept with the file copy. All correspondence concerning a requisition should refer to the serial number.

Before forwarding requisitions to the Chief Signal Officer of the Army, the Chief Signal Officers, Departments of the East, Missouri, California, and Columbia will refer requisitions to the property depot in their department, the depot to indicate what can be supplied from stock on hand. Great care must be exercised that articles purchased for fire control installations shall not be issued or reported available for issue on requisitions for signal service equipments and stores, and vice versa.

254. Whenever it appears in the interests of the service to do so, the department chief signal officers having a signal corps property depot in their department will be authorized by the Chief Signal Officer of the Army to direct issues of small amounts of maintenance supplies without reference to the Chief Signal Officer of the Army. In such cases, however, a copy of the invoice must be forwarded to the telegraph division of the signal office, so that the issues may be credited on the card record of signal corps equipment.

255. The Signal Corps property depots are established as follows:

Fort Wood, New York Harbor.
 Fort Omaha, Nebraska.
 Benicia Barracks, California.
 Seattle, Washington.
 Manila, P. I.

The directions to property depot for the issuance of supplies when approved by the Chief Signal Officer of the Army will be forwarded direct to such depot, as there is no occasion for administrative action by the chief signal officers of the departments. Such orders for issue after shipment is made will be returned to the chief signal officer direct, with notation showing date and manner of shipment, inclosing a copy of invoice when called for. Articles not supplied are then ordered from other property depots or purchased.

256. Property officers at supply depots in the United States will submit quarterly requisitions for supplies at least three months preceding the period for which required, the requisition for the Philippines Division to be made annually on July 1 and for Alaskan stations on January 1. In forwarding such requisitions from supply depots the chief signal officers of departments will indicate items which can best be purchased at or in the vicinity of department headquarters.

257. All requisitions from coast artillery stations for signal property for use in original installations for fire control and direction will, prior to their submission to the Chief Signal Officer of the Army, receive the approval of the Chief of Artillery. Officers making such requisitions will plainly indicate on the face of each such requisition and on the brief "Special requisition for fire control installation." These requisitions will include articles of character mentioned only.

258. Officers of the Signal Corps charged with filling requisitions for personal and office stationery will make quarterly requisition at least two months in advance on the department quartermaster for all necessary stationery. Enlisted men of the Signal Corps in charge of telegraph and telephone offices at military posts will look to the post quartermaster for stationery for their offices.

259. The issue of stationery by the Signal Corps will hereafter be made only to offices on United States military telegraph lines where its use is not exclusively for military purposes. Telegraph blanks, message envelopes, and printed forms of the Signal Corps will be issued as heretofore.

260. Requisitions from Signal Corps property depots must classify supplies into prepared lists. For example, telephones of all kinds, telephone, spare parts, switchboards, etc., should comprise a list separate from other supplies. Separate requisitions should also be made for bicycles, parts for them, typewriters and parts for them, submarine

cable gear, stationery, and submarine cable testing or operating instruments.

261. All requisitions must be submitted in duplicate, using as far as practicable Forms 57, 63, and 64 (1905).

262. Current requisitions for regular supplies should be prepared to cover quarterly periods, and in order to insure receipt of the supplies should be forwarded at least two months before the supplies are actually required. Items should be arranged alphabetically except as noted in Par. 260.

263. The requisitions for Signal Corps supplies for use in Alaska will be made to the chief signal officer, department of the Columbia.

264. Requisition for all supplies for use in the Philippines will be made annually by the chief signal officer of the division.

265. Requisitions for each separate typewriter should be forwarded to the Chief Signal Officer of the Army for action, stating fully and explicitly the necessity for their use. This does not apply to such typewriters as are absolutely necessary for the proper performance of necessary work at Signal Corps posts and at important telegraph offices in the Philippine Islands and Alaska.

266. Requisitions for articles to be used in fire-control installations (Form No. 63—1905) must not include any supplies for general service, as the purchases are made from separate appropriations.

267. Department chief signal officers will see that timely requisitions for material for military maneuvers within their departments are made so as to permit of the purchase and shipment of such material by freight to points where it is to be used. Specific instructions should be given to signal officers at maneuvers to recover all property that can be again used, to properly pack and to ship the same to points where it may be needed.

268. Chief signal officers of departments are charged with the examination, revision, and recommendation of all requisitions for Signal Corps property, so that when received at this office the Chief Signal Officer of the Army will have knowledge that these requisitions have been under the scrutiny of officers familiar with requirements and so have the benefit of their recommendations.

269. Electrical assistants or assistant electrical engineers acting as overseers will, when necessary, provide storekeepers for their posts or districts with a list of supplies for which requisitions should be made. Under ordinary circumstances it will be unnecessary for civilians to make requisitions for construction supplies.

270. When it is necessary for engineering employees to make requisitions for either construction supplies or personal equipment, Form 63—1905, should be used and duplicate copies should be forwarded to the officer under whom the employee is engaged.

271. Where requisitions must be made out for work for several posts in an artillery district, care should be taken to separate the requisitions by posts, unless the shipments are to be made to a district storekeeper for general distribution.

DECISIONS CONCERNING ISSUES.

272. The visual signaling outfit for organizations will consist of flag kits and fieldglasses, as follows:

The 2-foot flag kit complete consists of a khaki-colored canvas case containing a light bamboo staff in three sections, total length $5\frac{1}{2}$ feet; one 2-foot red flag and one 2-foot white flag. They will, as funds are available, be issued two to each company, troop and field battery for military signaling. Two fieldglasses will be ultimately issued to each company, troop and battery for military signaling. Issues for the present will be one new glass and one old-pattern fieldglass to such organizations as are designated by department commanders.

273. Push-buttons, door-bells, and buzzers are furnished by the Quartermaster's Department, and not by the Signal Corps. The Signal Corps supplies call - bells and buzzers only for night signals on telephone-switchboards.

274. Telegraph instruments for practice purposes will not be issued except to such posts as, in the opinion of the department commander, are of sufficient importance and strength to justify the belief that practical results or benefit would be derived therefrom.

275. Bicycles are not issued for transportation purposes, but only for repair work on telegraph lines and kindred work connected therewith.

276. The furnishing of time service to posts is not a function of the Signal Corps, but of the Quartermaster's Department. (Decis. C. S. O. Jan. 18, 1905.)

277. A crowfoot zinc should last about two months. A main-line battery should not consume more than $1\frac{1}{2}$ pounds of sulphate of copper per month per cell, and a local not more than 2 pounds per month.

278. Master signal electricians of the Signal Corps will be supplied with the following technical books, for which they will be responsible:

Manual No. 2, Regulations for Management of United States Military Telegraph Lines.

Manual No. 3, Electrical Instruments and Equipments of the U. S. Signal Corps.

Manual No. 4, Submarine Cables.

Manual No. 5, Manual of Photography.

Manual No. 6, Manual of Visual Signaling, U. S. Signal Corps.

Handbook of Electrical Machinery and Apparatus of the U. S. Seacoast Defenses.

Electrical Engineers' Pocket Book—"Foster."

Handbook on Engineering—"Tully."

ISSUES TO THE ORGANIZED MILITIA.

279. The laws governing the issue of public property to the organized militia of States, Territories, and the District of Columbia are abstracted as follows:

The act of March 2, 1903, appropriated the sum of \$2,000,000 for "New arms and equipment for organized militia," to be available until spent, and to be apportioned according to the number of troops serviceable for the field.

The act of January 21, 1903, amending section 1661, Revised Statutes, provides for an annual appropriation of \$1,000,000 for "Arming and equipping the militia," to be available until expended and to be apportioned to the States according to the number of representatives in Congress, provided there are 100 militiamen to each representative, the allotment to the Territories and the District of Columbia being discretionary with the Secretary of War, subject to the approval of the President.

The governors of States and Territories and the commanding general, District of Columbia militia, in making their requisitions upon the Secretary of War for public property designate the allotment to which the value of the property should be charged and from which reimbursement is made to supply bureaus by the Secretary of War.

The act of March 1, 1899, requires chiefs of supply bureaus to issue such public property as is ordinarily issued by them, upon requisitions from the commanding general, District of Columbia militia, as may be approved by the Secretary of War. In his interpretation of this act the Judge-Advocate General of the Army decides that in this act Congress bears the same relation to the organized militia of the District of Columbia as do the State legislatures to the organized militia of their respective States and that the quantity of issues is limited only to the approval of the Secretary of War. He also decides that the act of March 1, 1899, is not superseded or annulled by the acts of January 21, 1903, and March 2, 1903, and that the District of Columbia can draw property to the full value of its allotment under these acts and, in addition, draw such property under the act of March 1, 1899, as the Secretary of War may approve. The supply bureaus are not reimbursed for the value of such issues under act of March 1, 1899.

Requisitions, Form new No. 60 (old No. 214^a), signed by Governors of States and Territories and by the commanding general, District of Columbia militia, are forwarded direct to the Secretary of War. The Secretary of War forwards requisition to the chief of the supply bureau for an estimate of cost, who returns it with the information. If approved, the Secretary of War returns it to the chief of the supply bureau for issue. The supplies are issued and shipped on Government bill of lading. They are invoiced, receipts accomplished, and

accounted for on annual returns by the party to whom issued. An itemized statement showing the value of property is forwarded to the Governor or commanding general, District of Columbia militia, and the Secretary of War informed that all action has been taken and request made for reimbursement to credit of the supply bureau.

280. The Signal Corps does not carry on hand a large stock of the various special electrical instruments and other equipment, and upon receipt of requisitions orders are placed with manufacturers. To insure receipt of Signal Corps supplies, requisitions should be forwarded (in duplicate) so as to reach the Secretary of War at least five months prior to the time when the equipment is required.

281. Issues to the militia under the act of January 21, 1903, are confined to such articles as are procured under direct provisions of law for issue to the regular forces of the United States Signal Corps.

282. Experimental equipments will not be issued, but only such stores as are necessary to equip the militia in the same manner as the main portion of the Regular Army.

STATIONERY.

283. Stationery and office supplies are furnished by the Quartermaster's Department, as set forth in paragraphs 1068 and 1069, Army Regulations, and the Signal Corps supplies stationery for telegraph offices doing commercial business. A letter from the Quartermaster-General of the Army defining the policy in this matter is as follows:

WAR DEPARTMENT,
OFFICE OF THE QUARTERMASTER-GENERAL,
Washington, October 12, 1905.

CHIEF SIGNAL OFFICER,
U. S. Army,
Washington, D. C.

SIR: In reply to your letter of the 28th ultimo you are respectfully informed that stationery and expendable desk supplies have been and are now issued quarterly on approved requisitions by the Quartermaster's Department under paragraph 1069, Army Regulations, to the Signal Corps at points where they are performing only military duty and for performing military duty only at other points, and that this practice will be continued, the Signal Corps in this respect being regarded as on the same footing as other corps of the Army to which the Quartermaster's Department issues stationery, etc., for purely military purposes.

Respectfully,

C. F. HUMPHREY,
Quartermaster-General, U. S. Army.

PACKING PROPERTY.

284. All instruments and other articles of the Signal Corps must be carefully packed for shipment to avoid damage in transit, especially when intended for distant transportation, as to the Philippines or Alaska.

285. On opening any packages of Signal Corps supplies received from the depot the packer's ticket inside should be secured, and in case of any discrepancy in the number of articles this packer's ticket must be returned to the shipper with report of the deficiency.

286. The following extract from the proceedings of the equipment board, Quartermaster-General's office, on the subject of packing boxes is furnished for the information and guidance of all concerned.

[Extract.]

That the uniform size of packing-boxes which would meet nearly all the requirements as to shipping in escort wagons or by pack animals, as well as cause the most advantageous handling for transportation beyond the sea should be of dimensions as follows:

For escort-wagon transportation, 38 by 19 by 15 inches (outside measurements).

That these boxes should be constructed of 1-inch pine lumber dressed on one side and to be bound properly with hoop-iron.

* * * * *

That sacking or baling should be substituted whenever practicable.

That all supplies intended for field service when practicable should be packed in boxes of the dimensions given above, weight not to exceed 150 pounds gross.

It is an exceptional case when stores and equipments for field service can not be so packed.

(a) In some (exceptional) cases to avoid destroying unity of equipment and separation into component parts the loss of any one of which would render the others useless the gross weight packed may exceed 150 pounds.

(b) In other (exceptional) cases where the stores are now packed in boxes or bales the gross weight of which is under the limit of 150 pounds and the dimensions of which, determined by the nature of the stores and the number of units necessarily carried, are within the above-prescribed dimensions they may be packed as heretofore.

In all other cases when the dimensions of the stores or equipments will allow the length and breadth of the standard box should be rigidly adhered to, but the height may be slightly varied.

* * * * *

The majority of supplies of the Quartermaster's Department * * * can be readily packed in the standard-sized boxes by reducing the number of articles and keeping within the limit of 150 pounds gross weight.

* * * * *

Name of the consignee should be on top of box. Sides: Contents and name of packer on one side, and name of consignor, also initials of purchasing officer, initials of department, with month and year of purchase.

The ends should show contents: — gross, — tare, — net, pounds and shipping number. Also in diamond figure should be marked the number of invoice on which the stores are shipped.

The department insignia should be stamped or stenciled on both sides and ends of all boxes.

* * * * *

For such smaller sizes as may be necessary the boxes will be exact subdivisions of the boxes above mentioned.

SHIPMENT OF PROPERTY.

287. The act of Congress approved June 8, 1896, limits the weight of all mail packages to 4 pounds. When articles are ordered transferred from one station to another, or to this office, by mail, care must be exercised to see that the packages do not exceed this weight.

Where this weight would be exceeded in one package and it is possible to divide the articles, two or more packages must be made.

288. Instruments and all articles of value sent through the mails must be registered. Postage stamps for this purpose will be furnished by the Quartermaster's Department.

289. The regulations concerning penalty envelopes for free postage are set forth in Army Regulations, paragraphs 843 to 848, and it should be noted that the use of freight or express for transmitting official letters or packages that can be sent by mail is forbidden, that the weight of packages is limited to 4 pounds, and that penalty envelopes will not be furnished to merchants or other dealers to cover the transmission of public property.

Article VII.

STANDARD SIGNAL CORPS SUPPLIES.

290. VISUAL SIGNAL EQUIPMENT.

Ardois electric night signaling outfit, complete: All parts of standard outfit enumerated page 153, Manual No. 6. Requisitions must specify voltage of electric lighting current available; for spare parts, give name of maker of outfit.

Bombs, red.

Bombs, white.

Bombs, green.

Bombs, smoke, white.

Bombs, smoke, black.

Bombs, smoke, yellow.

Calcium carbide, lbs.; lumps, for 1898 model acetylene lanterns.

Calcium carbide, lbs.; granulated, for station acetylene lanterns.

Calcium carbide, cartridges; for field acetylene lanterns.

Cartridges for Very pistols, supplied in red, white, or green.

Code cards.

Cipher disks.

Compass, magnetic.

Flags. (*See Kits.*)

Field glasses, Galilean types:

Glasses, field, aluminum; with case, sling, and strap; model 1894, about 5-power.

Glasses, field, Avizard; with case, sling, and strap; 4-power.

Glasses, field, brass; with case, sling, and strap; model 1894, about 5-power.

Glasses, field, Bausch & Lomb; with case, sling, and strap; 4-power.

Glasses, field, model 1905, day and night; with case, sling, and strap; 2-power, $3\frac{1}{2}$ and $5\frac{1}{2}$.

Glasses, field, Liverpool; night glass, with case, sling, and strap; 4-power.

Glasses, opera; for field-glass box which forms part of the full-dress uniform. Issue discontinued.

Glasses, field, Voightlander; with case, sling, and strap; 4-power.

Field glasses, Prismatic types:

Glasses, field, Bausch & Lomb (also called Zeiss Prismatic); with case, sling, and strap; 8-power.

Glasses, field, Goerz (also called Treider-Prismatic); with case, sling, and strap; 7-power.

Glasses, field, Voightlander; with case, sling, and strap; 12-power.

Glasses, field, Warner & Swasey; with case, sling, and strap; 6-power and 8-power.

Glasses, eye, smoked, with case.

Heliograph, station, 8-inch mirrors, complete (issue discontinued).

Consists of—

1 sun mirror, 8 inches.

1 station mirror, 8 inches.

1 mirror bar.

1 sighting rod.

2 attachment screws.

1 shutter.

1 lever for attachment screw.

1 screw-driver and gimlet combined.

Heliograph, field, complete with tripod and cases. (Parts composing complete outfit, see p. 72, Manual No. 6.)

Kits, 2-foot, flag, complete.

Consists of—

Canvas case, with strap.

3 sections bamboo staff.

1 white flag, 2 feet.

1 red flag, 2 feet.

Kits, 4-foot, flag, complete.

Consists of—

Canvas case, with strap.

3 sections bamboo staff.

1 white flag, 4 feet.

1 red flag, 4 feet.

Lantern, station, acetylene, complete (issue discontinued). (Description and parts, see p. 120, Manual No. 6.)

Lantern, acetylene, types A and B model 1898 (issue discontinued).

Lantern, field, acetylene, complete. (Description and parts, see p. 111, Manual No. 6.)

Lantern, field, oil. Issue discontinued.

Lanterns, signal, R. R., brass.

Mortars, iron, for signal bombs, 5 inches diameter.

Message pads, field.

Pistols, Very, for night signals.

Rockets, sequence red and white combinations.

Rockets, smoke, white.

Rockets, smoke, black.

Rockets, smoke, yellow.

Staffs, flag, 12-foot, in 3 sections. Issue discontinued.

Shutter, heliograph, F. and G. 1905 model, 6-blade.

Torches and all accessories; issue discontinued; transfer to S. C. property officer at depot.

Telescopes, Warner & Swasey, 18 and 24 power, with tripod complete. In rectangular leather carrying case.

Telescopes, Warner & Swasey, 1898 model, field-artillery type, with leather cover and long tripod, complete.

Telescopes, brass, 4-draw, old style.

Telephoto outfits. (See Ardois above.)

Telescope-holders; for attachment to trees; specify size of telescope.

Telescope-holders; adapted for heliograph tripod.

Tripod, cavalry, folding; with canvas case; for heliograph and field lantern.

291. EQUIPMENT FOR FIRE CONTROL CONSTRUCTION.

Aeroscope, controller, meteorological.

Aeroscope, controller, tide.

Aeroscope, indicator, meteorological.

Aeroscope, indicator, tide.

Aeroscope terminal.

Anemometer.

Anemometer device for operating stop-watch.

Atmosphere board.

Bag, inspector's instrument.

Barometer, aneroid.

Barometer, mercurial.

Batteries, storage, telephone, type A (15 cells 10 amp. disch.).

Batteries, storage, telephone, type B (15 cells 15 amp. disch.).

Batteries, storage, telautograph E-7 (15 cells).
 Batteries, storage, telautograph E-11 (60 cells).
 Batteries, storage, telautograph E-13 (60 cells).
 Batteries, storage, telautograph E-15 (60 cells).
 Batteries, storage, telautograph F-11 (60 cells).
 Batteries, storage, telautograph F-13 (60 cells).
 Batteries, storage, telautograph F-15 (60 cells).
 Batteries, storage, telautograph PT (60 cells).
 Bells, T. I., large (time interval).
 Bells, T. I., small (time interval).
 Booster, size 1, 40 ampere output.
 Booster, size 2, 60 ampere output.
 Booster, size 3, 105 ampere output.
 Box, firing, signal.
 Box, for T. I. bells.
 Box, for T. I. bells, irons for.
 Box, mortar switch.
 Box, junction.
 Box, junction, 3 way.
 Box, outlet, emplacement.
 Box, outlet, searchlight.
 Box, terminal, 1-strip.
 Box, terminal, 2-strip.
 Box, terminal, 4-strip.
 Box, terminal, 24-strip.
 Box, terminal, 30-strip.
 Box, terminal, for submarine cables, size 1 (17 by 14 by 5 inches).
 Box, terminal, for submarine cables, size 2 (32 by 19 by 5 inches).
 Box, terminal, weatherproof, 1-strip.
 Box, terminal, weatherproof, 8-strip.
 Box, terminal, weatherproof, 16-strip.
 Box, terminal, weatherproof, 24-strip.
 Cable, distributing switchboard, 12-pair.
 Cable, switchboard, standard, 20-pair.
 Cabinet, cut-out, type A (for 2-gun battery).
 Cabinet, cut-out, type B (for 3-gun battery).
 Cabinet, cut-out, type C (for 4-gun battery).
 Cabinet, cut-out, type D (for 5-gun battery).
 Cabinet, cut-out, type E (for mortar batteries).
 Cabinet, supply.
 Cable record cards.
 Cases, reagent testing, complete.
 Cable tags.
 Cords, connecting, flexible armor.
 Clocks, time-interval.
 Clocks, time-interval, springs for.
 Coils, choke.
 Clocks, time-interval, hooks for.
 Coil, retardation, telephone.
 Coil, repeating, telephone.
 Condenser, 2 m. f. (square type).
 Condenser, 3 m. f. (square type).
 Condenser, 10 m. f. (flat type).
 Cut-off jack-sets.

Forming-strips
Heads, cable terminal.
Interrupter.
Interrupter-brackets.
Key-strap, heavy.
Key, telegraph.
Megaphone.
Motor-generator, telephone, $\frac{1}{2}$ K. W.
Motor-generator, telephone, 1 K. W.
Paint-brushes, 2-inch, flat.
Panel, telegraph storage battery charging.
Psychrometer.
Relay, telegraph main line.
Receiver, telephone, single head, f. c.
Receiver, telephone, double head, f. c.
Stop-watch.
Sonder, telegraph, local.
Sonder, telegraph, main line.
Switch-knife, 25 amperes, d. p. s. t.
Switch-knife, 25 amperes, 6 pole d. t.
Switch-knife, 25 amperes, d. p. d. t.
Switchboard, telephone, 10-line, F. C. Ss.
Switchboard, telephone, 20-line, f. c.
Switchboard, distributing, type A (1 fire commander and 2 battery-panels).
Switchboard, distributing, type B (1 fire commander and 3 battery-panels).
Switchboard, distributing, type C (1 fire commander and 4 battery-panels).
Switchboard, distributing, type D (1 fire commander and 5 battery-panels).
Switchboard, distributing, type E (two panels for mortar-batteries).
Switchboard, telegraph, 2-line.
Switchboard, telegraph, 4-line.
Switchboard, telegraph, 6-line.
Switchboard, power, complete.
Switchboard, power, telephone.
Telaugraph-hooks.
Telaugraph-receiver, waterproof.
Telaugraph-receiver, indoor.
Telaugraph-receiver, remodeled.
Telaugraph-transmitter.
Telaugraph-transmitter brackets, pair.
Telaugraph-wall terminal.
Terminal block, telephone.
Telephone, battery-commander, F. C. composite
Telephone, portable, f. c.
Telephone, breast, f. c., composite.
Telephone, breast, strap for.
Telephone, plotter's set, f. c.
Telephone, desk, f. c., composite.
Telephone, emplacement, f. c. composite.
Telephone, wall, f. c. composite.
Telephone, hand set, f. c.
Telephone, hand-set switch, f. c.
Telephone, head set, f. c.
Terminal strips.
Thermometers.

Wind-vane.
Wireless sets, portable.
Zone-signal controller, complete.
Zone-signal nipple.
Zone-signal lamps, complete.

292. INSULATING AND SPLICING MATERIALS.

[This list includes both fire-control and general service supplies. General specification No. 210 covers insulating and splicing material.]

Alcohol, grain, gallons.
Armalac, gallons.
Asbestos, as ordered.
Asphaltum varnish, gallons.
Beeswax, yellow, pounds.
Chatterton's compound, domestic, pounds.
Cloth, emery, quires (specify size).
Cloth, crocus, quires.
Cotton wicking, balls.
Flax, sewing, 8 or 12 strands, $\frac{1}{2}$ or 1 pound balls.
Instrument-lacquer, blue, colorless, or yellow, bottles.
Insulatine in 1-pound sticks.
Ozite, gallons, in tin cans of 1 gallon.
Paraffine, pounds, in 10-pound flat cakes.
Paraffine-oil, quarts.
Paint, P. & B., No. 2, supplied in $\frac{1}{2}$, 1, and 5 gallon cans and barrels.
Paint, Mogul, insulating, gallons.
Pasters, paper for wiped joints, rolls.
Rubber, pure, $\frac{3}{4}$ -inch strip on cambric; thickness of rubber about 0.0235 inch; $\frac{1}{2}$ -pound rolls wrapped in tin-foil and sealed in flat tin boxes.
Rubber, pink, 60 per cent. pure Para, $\frac{3}{4}$ -inch strip on cambric; thickness of rubber about 0.012 inch; $\frac{1}{2}$ -pound rolls wrapped in tin-foil and sealed in flat tin boxes.
Rubber cement in pint cans.
Shellac-varnish, orange or white, quarts and gallons.
Shellac-gum, pounds.
Sandpaper, quire or dozen sheets, Nos. 0, 1, and 2.
Sleeving, paper, $\frac{1}{8}$ -inch by 3-inch, per 1,000 or 100.
Sleeving, paper, $\frac{3}{8}$ inch by 2 $\frac{3}{8}$ inch, per 1,000 or 100.
Sleeving, cotton, per 100 yards.
Sleeving, McIntyre, state B. & S. gage.
Sleeving, lead, length as ordered. See line construction material for sizes and weights.
Soft-rubber tubing, $\frac{1}{8}$ -inch, $\frac{3}{8}$ -inch, and $\frac{1}{2}$ -inch bore, feet.
Solder, resin core, $\frac{1}{2}$ -pound spools, pounds.
Solder, half-and-half, in wire, 10-gage, pounds.
Solder, half-and-half, in bars, pounds.
Solder, plumber's wiping, in ingots, pounds.
Splicing-tool. A disk with handles for laying on armor-wires of D. S. cables.
Tape, friction, $\frac{3}{4}$ -inch wide, $\frac{1}{2}$ -pound and 1-pound rolls, in pasteboard boxes, pounds.
Tape, Grimshaw, 1-pound rolls, in pasteboard boxes.
Tape, Manson, 1-pound rolls, in pasteboard boxes.
Tape, Okonite, 1-pound rolls, in pasteboard boxes.
Tape, splicer's, 1-pound rolls, in pasteboard boxes, pounds.
Wire, seizing, No. 18 G. I. soft, pounds.

293. INSULATING COMPOUNDS.

In order that no confusion may exist concerning the use of the various insulating compounds which are ordered for fire-control work. the following instructions should be rigidly adhered to:

The compounds supplied are: Chatterton's Compound (first quality,) Insulatine, Ozite, Paraffine.

Chatterton's compound.—Chatterton's compound is a high-class insulator costing \$1 per pound and should be used only in sealing ends of cable where they are exposed to storage-battery fumes or in similar work where a high quality insulator is required.

Insulatine.—Insulatine is not a high quality insulator, and it is intended for use in sealing outlet-boxes where a wall of rubber exists between the insulatine and the conductor. It should never be used for insulating purposes only and is depended on more for its sealing qualities than for insulation. This material is comparatively cheap, costing about 12 cents per pound.

Ozite.—Ozite is used for sealing potheads in paper cable work. It may also be used for sealing the ends of rubber cable. Ozite is used for pothead work exclusively.

Paraffine.—Paraffine is intended for use in boiling out splices in paper cable and in drying the ends. It should never be used in pothead work or for sealing purposes.

294. LINE CONSTRUCTION MATERIAL.

[This list includes both fire-control and general-service supplies.]

Anchors, guy, D. & T.

Anchors, star, 1 $\frac{1}{8}$ -inch, No. 10.

Anchors, star, $\frac{3}{8}$ -inch, composition.

Anchors, expansion, $\frac{1}{2}$ -inch, composition.

Anchors, guy, Stombaugh, 8-inch.

Anchors, rock.

Dimensions of standard cross-arms.

Length.	Number of pins.	Pin spacing.		
		Ends.	Sides.	Centers.
<i>Feet.</i>				
3	2	4		28
5	4	4	15	22
6	6	4	12	16
10	8	4	15	22

Arresters, Mason's Standard, with or without fuses.

Brackets, oak.

Bolts, carriage (diameter, $\frac{3}{8}$ -inch; length, 4 $\frac{1}{2}$ inches).

Bolts, cross-arm, diameter $\frac{3}{8}$ -inch; supplied in five lengths: 12, 13, 15, 18, and 20 inches.

Bolts for cross-arm braces.

Bolts, lag (diameter, $\frac{1}{2}$ -inch; length, 4 $\frac{1}{2}$ inches).

Bolts, double arm, (diameter, $\frac{1}{2}$ -inch; length, 12 inches).

Boxes, junction, 3-way.

Boxes, cable, size A, 25-pair.

Boxes, cable, size B, 50-pair.

Boxes, telephone, outlet, for rifle ranges.

Boxes, telephone, portable, for rifle ranges.

Braces, cross-arm.

Brackets, iron, for lance pole insulators.

Cable, distributing, switchboard, f. c., 12-pair.

Cable, aerial, lead-covered. (*See* table of cables.)

Cable, telephone, switchboard, 20-pair.

Cable, tree, multiple conductor; supplied in 2, 6, 12, and 24 conductor (No. 24 B. & S.)

Clamps, strand, 2-bolt.

Clamps, strand, 3-bolt.

Clips, cable, Boston, or marline.

Cleats, porcelain:

2-wire for sizes No. 16 to No. 8.

2-wire for sizes No. 6 to No. 00.

3-wire for sizes No. 6 to No. 08.

3-wire for sizes No. 4 to No. 00.

1-wire cleat No. 4 to No. 9.

New England Telephone cleat with ear.

Conduit, loricated, as follows:

Conduit, $\frac{1}{2}$ -inch, loricated, feet.

Conduit, $\frac{3}{4}$ -inch, loricated, feet.

Conduit, 1-inch, loricated, feet.

Conduits, $1\frac{1}{2}$ -inch, loricated, feet.

Conduit elbows, $\frac{1}{2}$ -inch, loricated.

Conduit elbows, $\frac{3}{4}$ -inch.

Conduit elbows, 1-inch.

Conduit elbows, $1\frac{1}{2}$ -inch.

Conduit couplings, $\frac{1}{2}$ -inch.

Conduit couplings, $\frac{3}{4}$ -inch.

Conduit couplings, 1-inch.

Conduit couplings, $1\frac{1}{2}$ -inch.

Cross-arms, iron pole.

Cross-arms, wood — pin.

Forming strips.

Fuses, D. & W., 3-ampere, midget.

Fuses, D. & W., 6-ampere, midget.

Fuses, D. & W., 15-ampere, midget.

Fuses, D. & W., 20-ampere, cartridge, 250 volts.

Fuses, mica, 1 ampere.

Heads, cable terminal, Size A, 26-pair.

Heads, cable terminal, Size B, 52-pair.

Inclosed fuses:

Nonindicating (250 volts, 3 amperes), $1\frac{1}{2}$ inches in length over all.

Nonindicating (250 volts, 5 amperes), $1\frac{1}{2}$ inches in length over all.

Nonindicating (250 volts, 15 amperes), $1\frac{1}{2}$ inches in length over all.

Indicating (250 volts, 30 amperes), $2\frac{3}{8}$ inches in length over all.^a

Indicating (250 volts, 50 amperes), $3\frac{3}{8}$ inches in length over all.

Indicating (250 volts, 100 amperes), $3\frac{3}{8}$ inches in length over all.

Insulators, glass, D. P.

Insulators, pony, porcelain.

Insulators, pony, glass.

Insulators, lance pole, pig-tail, hard-rubber or molded-mica.

Insulators, lance pole, clamp, hard-rubber or molded-mica.

Insulators, strain, P. & S.

Insulators, porcelain, standard knobs, as follows:

No. 4 (diameter, $1\frac{1}{2}$ inches; length, $1\frac{1}{8}$ inches).

No. 5 (diameter, 1 inch; length, $1\frac{1}{4}$ inches).

^a Ordered in special lengths of $3\frac{3}{8}$ inches.

Insulators, porcelain, standard knobs, as follows—(Continued).

No. 6 (diameter, $\frac{1}{2}$ inch; length, $\frac{1}{2}$ inch).

No. 11 (diameter, $1\frac{1}{2}$ inches; length, $\frac{1}{2}$ inch).

Insulators, tree, Genl.

Insulators, tree, Victor.

Moulding signs.

Moulding, type A (two $\frac{1}{2}$ by $\frac{1}{2}$ inch grooves).

Moulding, type B (three $\frac{1}{2}$ by $\frac{1}{2}$ inch grooves).

Moulding, type C (two $\frac{1}{2}$ by $\frac{1}{2}$ inch grooves).

Nails, 8d, buttonhead.

Paint, Mogul, preservative, gallons.

Pipe, iron, 2-inch, 3-inch, galvanized, per foot.

Pins, cross-arm.

Plugs, for iron poles.

Poles, iron.

Poles, lance.

Poles, wooden.

Dimensions of poles.

Length.	Circumference.		Length.	Circumference.	
	At top.	At 6 feet from bottom.		At top.	At 6 feet from bottom.
	<i>Inches.</i>	<i>Inches.</i>		<i>Inches.</i>	<i>Inches.</i>
20 feet	14	24	35 feet	22	37
20 feet	16	25	35 feet	25	40
25 feet	16	25	40 feet	22	40
25 feet	19	27	40 feet	25	43
25 feet	22	30	45 feet	22	45
30 feet	19	30	45 feet	25	46
30 feet	22	34	50 feet	22	46
30 feet	24	36	50 feet	25	48

Pole steps.

Rods, guy.

Rods, ground.

Sandpaper, standard.

Screws, brass, R. H., $\frac{3}{4}$ -inch, No. 6.

Screws, brass, R. H., 1-inch, No. 8.

Screws, brass, R. H., $1\frac{1}{2}$ -inch, No. 10.

Screws, brass, R. H., $2\frac{1}{2}$ -inch, No. 12.

Screws, brass, R. H., 3-inch, No. 12.

Screws, brass, R. H., 3-inch, No. 24.

Screws, brass, F. H., 1-inch, No. 8.

Screws, brass, F. H., 3-inch, No. 12.

Screws, brass, F. H., 3-inch, No. 24.

Seats, pole.

Sleeves, lead, sizes as follows:

Lead sleeving—weight C, 1-inch.

weight D, 1-inch.

weight B, $1\frac{1}{2}$ -inch.

weight C, 1-inch.

weight D, $1\frac{1}{2}$ -inch.

weight A, 2-inch.

weight B, 2-inch.

weight C, 2-inch.

Sleeves, lead, sizes as follows—Continued.

Lead sleeving—weight D, 2-inch.
weight A, $2\frac{1}{4}$ -inch.
weight B, $2\frac{1}{2}$ -inch.
weight C, $2\frac{3}{4}$ -inch.
weight D, $2\frac{1}{2}$ -inch.

NOTE.—Letters A, B, C, D refer to thickness of lead sleeve, A being heaviest and D the lightest. For weight per foot and thickness, see Kent's or Supplee's Mechanical Engineering Handbooks.

Sleeves, paper, $\frac{1}{8}$ -inch by 3 inches.

Sleeves, McIntyre, for No. 8, No. 12, and No. 14 wire.

Solder, half-and-half, in bars.

Solder, plumber's wiping, in 5-pound ingots, 40 per cent tin.

Strand, messenger.

Properties of Strand.

Diameter of—		Lay.	Ultimate strength.	
Wire.	Strand.		Bessemer.	Seimens-Martin.
<i>Inches.</i>	<i>Inches.</i>	<i>Inches.</i>	<i>Pounds.</i>	<i>Pounds.</i>
0.072	$\frac{1}{8}$	3	2,500	3,050
.109	$\frac{3}{8}$	$3\frac{1}{2}$	4,200	4,860
.120	$\frac{3}{8}$	$3\frac{1}{2}$	5,700	6,800
.134	$\frac{3}{8}$	4	7,600	7,000
.165	$\frac{1}{2}$	$4\frac{1}{2}$	9,800	11,000

Supports, messenger.

Tapes. (*See* insulating material.)

Thimbles, guy, for $\frac{1}{8}$ -inch and $\frac{3}{8}$ -inch strand.

Tags, cable.

Tubes, porcelain:

Diameter of bore, $1\frac{3}{8}$ -inch; length, $1\frac{1}{2}$ inches.

Diameter of bore, $1\frac{1}{8}$ -inch; length, 3 inches and 8 inches.

295. WIRE.

Wire, buzzer, miles. (This consists of a strand of 2 steel and 1 copper wires, saturated cotton insulation; supplied on spools of one-half mile each.)

Wire, Bridle, feet. (This is similar to pothead wire except conductor is No. 16 copper; supplied in coils of 500 feet.)

Wire, copper, hard-drawn, No. 12, miles.

Wire, copper, hard-drawn, No. 14, miles.

Wire, copper, H. D., No. 14, weatherproof, feet. Coils 32 to 50 pounds

Wire, copper, H. D., No. 12, weatherproof, feet. Coils 53 to 72 pounds.

Wire, No. 12, copper, soft-drawn, rubber-covered; supplied in 500-foot coils.

Wire, No. 14, copper, soft-drawn, rubber-covered; supplied in 500-foot coils.

Wire, fuse; state amperage.

Wire, field, miles. (This is the standard for field use on ground; consists of a strand of 18 steel and 1 copper, rubber-covered; supplied in half-mile coils.)

Wire, No. 14, G. I., miles. (This is the standard for post telephone-lines and lance-lines. It is supplied in half-mile coils, each weighing about 48 pounds.)

Wire, No. 9, G. I., miles. (This is the standard for telegraph-lines. It is supplied in half-mile coils, each weighing about 152 pounds.)

Wire, inside twisted pair, feet. (This is the standard for inside telephone-wire. It is No. 18 copper; supplied in coils of 500 feet.)

Wire, magnet; specify gauge; supplied in single or double cotton or silk insulation.

Wire, outside, twisted pair, feet. (This is the standard used for connecting pole-lines to buildings. It is No. 14, copper, rubber-covered and braided; supplied in coils of 500 feet.)

Wire, pothead, feet. (This is a twisted pair, having high resistance, rubber insulation; conductor No. 19, copper; supplied in coils of 500 feet.)

Wire, resistance, finished as follows:

- Single cotton covered.
- Double cotton covered.
- Single silk covered.
- Double silk covered.
- Bare.

Wire, silicon, bronze, bare, No. 21 gage; supplied in ½-mile spools.

Wire, zone, signal, No. 16, copper, rubber and braid insulation, coils 500 feet.

Wire, German-silver, 30 per cent alloy, see table below.

Wire, Climax, see table below.

Wire, S. B., bare, No. 28 (Driver-Harris).

Wire, German-silver, 18 per cent alloy.

Table of lengths and resistances of standard spools "18 per cent" German-silver alloy resistance wire.

B. & S. gauge.	Net weight, ounces per spool.	Feet per ounce, approximate.					Ohms per ounce, approximate.					Ohms per 100 feet, approximate.
		Double cotton.	Single cotton.	Double silk.	Single silk.	Bare.	Double cotton.	Single cotton.	Double silk.	Single silk.	Bare.	
20	4	19	19	20	20	20	3.5	3.5	3.5	3.6	4.0	18.4
22	4	29	30	30	31	32	8.7	9.0	9.0	9.1	10.2	30.0
24	4	45	48	49	50	51	21.0	22.0	22.0	23.0	26.0	47.0
28	2	100	115	120	125	130	120.0	135.0	139.0	145.0	165.0	119.0
30	2	150	175	185	195	200	286.0	332.0	345.0	362.0	416.0	189.0
31	1	180	220	230	245	260	432.0	519.0	537.0	574.0	662.0	239.0
32	1	220	270	285	300	325	658.0	807.0	840.0	904.0	1,050.0	295.0
33	1	270	340	350	380	410	992.0	1,250.0	1,310.0	1,420.0	1,680.0	374.0
34	1	320	410	440	480	520	1,490.0	1,930.0	2,030.0	2,530.0	4,230.0	476.0
35	1	370	500	540	600	650	2,200.0	2,970.0	3,180.0	3,532.0	4,230.0	602.0
36	1	440	610	650	740	825	3,260.0	4,580.0	4,880.0	5,500.0	6,730.0	756.0
37	1	500	740	800	920	1,040	4,770.0	6,950.0	8,080.0	8,410.0	10,700.0	955.0
38	1	.....	.....	970	1,150	1,310	.....	.....	12,500.0	14,100.0	16,900.0	1,200.0
39	1	.....	.....	.....	1,150	1,400	.....	.....	21,600.0	22,000.0	26,800.0	1,530.0
40	1	.....	.....	.....	1,400	1,730	.....	.....	29,700.0	34,700.0	42,700.0	1,930.0

(a) These values are approximate.

(b) When "Climax" resistance wire is ordered it should have a resistance approximately 2.777+ times that of table. The other values for Climax wire are the same as above.

(c) When 30 per cent German-silver wire is ordered it should be estimated that its resistance is approximately 1.55 times that of 18 per cent wire.

(d) Bare wire will be supplied in packages as above. Its resistance, etc., may readily be determined from data above.

(e) Bare S. B. wire No. 28 supplied in ounce spools (about 150 feet). Resistance, 2.1 ohms per foot.

296. LINE CONSTRUCTION TOOLS.

[Standard construction tools are described in specification No. 219.]

Adze, 4-inch blade, house carpenter's full head.

Axe, hand (broad hatchet), 5-inch blade.

Axes, handles for.

Axe, lineman's, 5-pound, long handle.

Bags, lineman's, canvas with leather bottom, 20-inch.

Bars, crow, wedge-point, 17 pounds, steel.

Bars, digging, 1-inch round, 8 feet long, weight 17 pounds, steel.
 Bars, digging, 1½ inches round, 8 feet long, weight 28 pounds, steel.
 Bars, digging and tamping, 1-inch round, tool steel, 7 feet long, weight 19 pounds.
 Bars, digging and tamping, 1-inch octagonal tool steel, 8 feet long, weight 25 pounds.
 Bars, digging (electric spud), steel tubing with cast blade and tamper.
 Belts, lineman's, for tools, 38 inches, 40 inches, 44 inches, with loops, rings, and safety strap.
 Belts, lineman's, safety.
 Bits, auger, sizes ¼-inch, ⅜-inch, ½-inch, ¾-inch, 1-inch, 1½-inch, all 8 inches long.
 Bits, expansion, ½-inch to 1½ inches.
 Bits, pole, Russell, Jennings, Irwin's, or Ford's, 12 inches by ⅝-inch and 16 inches by ¾-inch.
 Block, pulley, iron; single or double 3-inch; double or triple 6-inch; double or triple 10-inch.
 Block, roller, for cable.
 Braces, ratchet, 8-inch sweep, Miller's Falls or Barber's improved.
 Buffalo grip with pulleys, No. 1 size, for wires up to No. 6; No. 2 for wires up to No. 0.
 Chain, cow, 4 feet, with rings.
 Chain, steel, measuring, 100 feet.
 Chisels, cold, ¾-inch to 1-inch, tool steel.
 Chisels, socket-framing, handles for, ring-topped.
 Chisels, socket-framing, 1½ inches to 2 inches.
 Climbers, with straps, two sizes, 16 inches and 18 inches.
 Climbers, straps for.
 Come-along with strap and grip (Jack strap.)
 Connectors (splicing clamps), for wires No. 9 to No. 16, iron.
 Connectors (splicing clamps), McIntire connections, for No. 8 to No. 12 copper.
 Coppers, soldering, with handles, 1 pound, 2 pounds, and 4 pounds.
 Coppers, soldering, handles for with ring ferrules.
 Drill, rock, per pound, large and small sizes.
 Files, dentist.
 Files, 5-inch triangular.
 Files, 8-inch round.
 Files, flat.
 Files, bastard.
 Files, half-round, 8-inch.
 Files, handles for, wood.
 Furnace, gasoline, with 5-inch pot and ladle.
 Hatchet, 4-inch blade.
 Hammers, claw, 18-ounce.
 Hammers, machinist, 2-pound.
 Handles for hammers and hatchets.
 Handles with tools.
 Hooks, cant, 4-foot, with handle.
 Hooks, carrying, 4-foot handle.
 Jenny, cable spinning; 2½-inch to 4-inch bore.
 Kit, inspector's pocket tool.
 Knives, draw, 12-inch blade.
 Knives, draw, 14-inch blades, telegraph pattern.
 Knives, electricians'.
 Lanterns, excavation, ruby globe.
 Pick handles.
 Pike poles, 12-foot, 16-foot, and 18-foot, 2 inches in diameter.
 Picks, 7 pounds to 8 pounds.
 Post-hole augers, 12-inch, 5-foot long.
 Post-hole diggers, 7-foot handle.
 Pike, guarded or raising, 14-feet.

Pliers, lineman's, 6-inch, side cutting.
 Pliers, 8-inch, side cutting.
 Pliers, 6-inch, diagonal.
 Pole-support, jenny.
 Pole-support, mule.
 Reels, pay-out, with handles and shoulder-straps.
 Reels, take-up.
 Reel jacks.
 Reel jacks, axles for, steel, 1-inch, 1½-inch, 2-inch, and 2½-inch per foot.
 Rope, pure manila hemp, ¾-inch, in coils of about 1,000 feet.
 Rope, pure manila hemp, 1-inch, in coils of about 1,000 feet.
 Rope, pure manila hemp, 1½-inch, in coils of about 500 feet.
 Rope, pure manila hemp, 2-inch, in coils of about 500 feet.
 Rope, pure manila hemp, 1-inch, in coils of about 500 feet.
 Rules, carpenter's, 2-foot.
 Rules, zigzag, 4-foot.
 Saws, crosscut, 5-foot.
 Saws, hack, blades, 12-inch.
 Saws, hack, adjustable frame, 9-inch to 12-inch.
 Saws, hand, 26-inch, 8-point.
 Saws, rip, 26-inch, 5½-point.
 Screw-drivers, 3 inches, 4 inches, 6 inches, and 12 inches.
 Shovels, 6-foot and 8-foot handles, with 18-inch straps.
 Shovels, handles for.
 Spades, handles for.
 Spades, grading, round and square pointed, D handles.
 Spoons, 6-foot and 8-foot handles, 18-inch strap.
 Sheaves, double and single, wood or iron, with one or two becketts, or with becket and hook, give length desired in inches.
 Tapeline, cloth, 100 feet and 50 feet, in feet and inches, leather case.
 Tool bag, service, complete, (leather).
 Torches, blow, hot blast.
 Tree trimmers, large size, without saw.
 Tree trimmers, large size, with saws.
 Tree trimmers, handles for, 18 feet, with ferrule joint.
 Vise, jackstrap, and 5½-inch vise, black leather strap.
 Wrench, combination lag and nut screw.
 Wrench, steel tie-wrench for No. 8, 10, and 12 wire.
 Wrenches, monkey, 10-inch and 12-inch.

297. ELECTRICAL ENGINEER'S TOOL CHEST.

[This chest is manufactured under specification No. 192.]

Name plate.

ELECTRICAL ENGINEER'S TOOL CHEST,
 U. S. SIGNAL CORPS.
 No. ——.

The tools are distributed as follows:

No.	COVER.
1.	1 backsaw, 10 inches.
2.	1 rule, 4 feet, zigzag.
3.	1 crosscut saw, 20 inches.
4.	1 rip saw, 22 inches.
5.	1 hacksaw frame, adjustable, No. 6.
6.	1 metallic tape, 50 feet.

PROPERTY REGULATIONS SIGNAL CORPS, U. S. ARMY.

No.

FIRST TRAY.

7. 1 spirit level, pocket, 3-inch.
8. 1 polarity indicator.
9. 1 wrench.
10. 1 riveting hammer, 15 ounces.
11. 1 claw hammer, 1 pound.
12. 1 jackknife.
13. 1 screw-driver, 5 inches.
14. 1 screw-driver, 10 inches.
15. 1 socket chisel, 1-inch, ring top.
16. 1 socket chisel, 1½ inches, ring top.
17. 3 files; 2 8-inch flat bastard, 1 8-inch clear edge hand.
18. 1 cold chisel, ½ inch.
19. 1 screw-driver, 2 inches (clock-maker's pattern).
20. 1 screw-driver, 2½ inches.
21. 1 tool holder with tools (7½-inch handle).
- 21a. 1 pair 6-inch dividers.

SECOND TRAY.

22. 1 ratchet brace, 8-inch throw.
23. 2 Buffalo grips, No. 2.
24. 1 12-inch scale, combination square.
25. 1 center head, combination square.
26. 1 square and bevel, combination square.
27. 1 hand vise.
28. 1 block plane.
29. 1 pair metal shears, 10-inch.
30. 1 soldering copper, jeweler's, No. 2.
31. 1 serving mallet.
32. 1 soldering copper, 1 pound.
33. 1 soldering iron, electric, No. 10.

THIRD TRAY.

34. 1 oilstone, soft Arkansas, 4½ inches by 1½ inches.
35. 1 pair pliers, 8-inch, side cutting.
36. 1 ladle, 13-inch.
37. 1 pair pliers, 5½-inch, long nose, side cutting.
38. 1 monkey wrench, No. 12.
39. 1 nail puller, "B."
40. 1 Stillson wrench, 14-inch.
41. 1 pair pliers, 6-inch, side cutting.
42. 1 pair pliers, diagonal cutting, 6-inch.
43. 2 combination splicing clamps.
- 43a. 1 wood countersink.

FOURTH TRAY.

44. 9 steel twist drills and 1 center punch (see list below).
45. 1 set alphabet punches, $\frac{1}{8}$ -inch.
46. 1 plumber's kettle.
47. 1 breast drill.
48. 2 shields for fire pot.
49. 1 set steel figures, $\frac{1}{8}$ -inch.
50. 1 expansion bit, $\frac{5}{8}$ -inch by $1\frac{1}{8}$ -inch.
51. 1 rabbet plane, $\frac{1}{2}$ -inch.
52. 1 cable sheath knife.
53. 1 set of auger bits with one 4-inch triangular file.

END OF CHEST.

No.

- 54. 1 furnace, plumbers', galvanized reservoir.
- 55. 1 magneto (furnished by U. S. Signal Corps).
- 56. 1 dozen hacksaw blades, all hard.

396. CONSTRUCTION TOOL CHEST.

[This chest is manufactured under specification No. 243.]

Name plate.

CONSTRUCTION TOOL CHEST,
U. S. SIGNAL CORPS,
No. —.

The chest shall be provided with a lock and duplicate set of keys.

- 2 gasoline torches.
- 1 jeweler's No. 1 soldering iron, with handle
- 2 No. 2½ soldering coppers, with handles.
- 2 10-inch backsaws, with miter box.
- 1 carpenter's crosscut saw, 20-inch.
- 1 carpenter's rip saw, 22-inch.
- 1 cable sheath knife.
- 1 plane, fore, 2½-inch blade.
- 1 plane, jack, 2-inch blade.
- 1 bit, bell hanger's, 24-inch.
- 2 hacksaw frames.
- 3 dozen hacksaw blades, 10-inch.
- 2 12-inch screw-drivers.
- 6 carpenters' claw hammers, 15-ounce, solid cast steel.
- 6 handles with tools, 8-inch.
- 12 rock drills, 1⅞-inch, rose point.
- 12 rock drills, 1⅝-inch, rose point.
- 6 heavy knives.
- 2 handaxes, 4½-inch.
- 1 set steel marking dies, letters.
- 1 set steel marking dies, figures.
- 1 polarity indicator.
- 1 block plane, 1½-inch blade.
- 1 center punch.
- 1 50-foot cloth tape, metallic.
- 2 "home" sets brace and bits.
- 2 come-alongs, with straps.
- 1 breast drill.
- 1 set twist drills, straight shank, ¼ to ½ inch in sixteenths.
- 1 pair 8-inch gas pliers.
- 2 pairs 6-inch diagonal cutting pliers.
- 2 pairs pliers, 6-inch snipe nose.
- 2 pairs pliers, side cutting, 8-inch.
- 2 pairs pliers, side cutting, 6-inch.
- 1 metal serving mallet.
- 1 wooden serving mallet.
- 2 inspector's pocket tool kits.
- 1 pair 8-inch shears.
- 1 service tool bag. Empty.
- 8 assorted files, with handles (2 bastard, half-round, 10-inch; 2 hand, safe edge, 6-inch; 2 3-square, slim taper saw files, 5-inch; 1 round file, 6-inch; 1 rasp, smooth, 10-inch.)
- 1 Stilson wrench, 12-inch.

- 1 pair snips, 10-inch.
- 1 wrench, screw, 12-inch.
- 1 rabbet plane, $\frac{1}{2}$ -inch blade.
- 2 gouges, $\frac{1}{4}$ -inch.
- 2 chisels, wood, 1-inch.
- 1 compass saw, 12-inch.
- 1 try-square, steel, 6-inch.

299. CABLE SPLICER'S CHEST.

[This chest is manufactured under specification No. 318.]

Name plate.

CABLE SPLICER'S CHEST,
U. S. SIGNAL CORPS.
No. —.

Equipment.

- 1 plumber's furnace, with two chimneys.
- 1 ladle.
- 1 inspector's pocket kit, specification No. 186.
- 1 hook, shave.
- 1 plumber's kettle, 5 inches.
- 2 soldering coppers, $2\frac{1}{2}$ and 4 pounds, with handles.
- 1 cable sheath knife.
- 1 hacksaw frame, adjustable, 10 inches.
- 2 hacksaw blades, 10 inches, medium quality, dozen.
- 1 dogwood cable mallet.
- 1 stearin, $\frac{1}{4}$ pound.
- 1 gummed paper, $1\frac{1}{2}$ inches wide, pounds (pasters).
- 1 hammer, claw, 15 ounces, with handle.
- 1 hammer, plumber's, 18 ounces, with handle.
- 1 canvas tool bag, leather bottom, 20 inches.
- 250 paper sleeves, $\frac{1}{4}$ inch by 3 inches.
- 2 cotton strips, 2 inches, in rolls, pounds.
- 6 wiping cloths, moleskin.
- 1 file, hand, smooth, 6 inches, with handle.
- 1 file, half-round, bastard, 6 inches, with handle.
- 1 rule, 2-foot, folding, boxwood, brass bound.
- 1 rasp, smooth, 12 inches, with handle.
- 1 saw, plumber's, Disston's, 14 inches.
- 1 pliers, pair, 8 inches.
- 1 snips, 10 inches.
- 3 drift pins, $1\frac{1}{4}$ inches, $1\frac{1}{2}$ inches, 2 inches.

300. PIPE FITTER'S CHEST.

[The chest is manufactured under specification No. 276.]

Name plate.

PIPE FITTER'S CHEST,
U. S. SIGNAL CORPS.
No. —.

Equipment.

- 2 pipe wrenches, 18 inches.
- 1 pipe vise, combination, swivel base, $3\frac{1}{4}$ -inch jaws, reversible jaws.
- 1 pipe cutter, No. 2 ($\frac{1}{4}$ inch by 2 inches).
- 1 stock for dies ($\frac{1}{4}$ inch by $1\frac{1}{4}$ inches), adjustable, with quick-opening and self-centering dies and guides.

- 1 set of dies for above stock ($\frac{1}{8}$ inch by $1\frac{1}{4}$ inches).
- 1 oil can, malleable iron, 5 ounces.
- 1 butt reamer, for brace, $1\frac{1}{4}$ inches.
- 1 pipe former, $\frac{1}{8}$ inch by $1\frac{1}{4}$ inches.
- 1 file, half-round, bastard, 6 inches.
- 1 rasp, smooth, 10 inches.
- 1 file, hand, smooth, 10 inches.

301. ELECTRICAL INSTRUMENT CASE.

[This instrument case is manufactured under specification No. 145.]

CONTENTS.

- 1 insulation and capacity test set consisting of the following in case:
 - 1 portable galvanometer of the D'Arsonval type.
 - 1 telescope and scale for above galvanometer.
 - 1 100,000-ohm box.
 - 1 combined shunt and switch.
 - 1 condenser set.
- 1 ohmmeter.
- 1 tripod, external to case.
- 1 service testing battery.
- 1 micrometer caliper, B. & S., No. 8, without ratchet stop, with morocco carrying case.
- 1 inspector's pocket tool kit.
- 1 testing telephone.
- 1 space for forms and reports.
- 1 space for books.

Miscellaneous parts and supplies.

- 1 galvanometer coil and mirror.
- 4 round-head plugs.
- 4 galvanometer coil connections.
- 2 milled-head screws.
- 1 piece felt.
- 4 screws for glass.
- 1 ohmmeter card.
- 1 piece chamois.
- 1 bottle vaseline.
- 1 bottle typewriter oil.
- 85 gr. No. 22 bare copper wire.
- 19 gr. advance wire.
- 18 gr. No. 22 manganin wire.
- 9 gr. No. 34 manganin wire.
- 5 gr. No. 40 manganin wire.
- 14 gr. No. 28 manganin wire.
- 1 glass window.
- 4 paper scales.
- 6 feet battery cord.
- 10 feet okonite wire.
- 8 ounces solder.

REPAIR KIT.

The repair kit contains the following instruments:

- 1 nickel-plated screw-driver.
- 2 pairs tweezers, nicked.
- 3 lower suspensions for galvanometer.
- 4 upper suspensions for galvanometer.

302. POST TOOL CHEST.

[The post tool chest is manufactured under specification No. 350.]

Name plate.

POST TOOL CHEST,
SIGNAL CORPS, U. S. ARMY.

No. —.

- 3 bits, $\frac{1}{8}$ -inch, $\frac{1}{16}$ -inch, and $\frac{1}{32}$ -inch.
- 1 brace, ratchet, ball-bearing, 8-inch throw.
- 1 chisel, socket, $\frac{3}{4}$ -inch, beveled edge.
- 1 chisel, cold, $\frac{3}{4}$ -inch.
- 1 file, round, $\frac{3}{16}$ by 8 inches, with handle.
- 1 file, saw, with handle.
- 1 file, flat, 8-inch, clear edge, with handle.
- 1 hammer, claw, 1-pound.
- 1 holder, tool, large size, containing the following:
 - 1 4-inch saw.
 - 1 8-inch saw.
 - 2 screw-drivers.
 - 1 chisel.
 - 1 gouge.
 - 2 awls.
 - 1 gimlet.
 - 1 three-cornered file.
 - 1 reamer.
- 1 hatchet, claw, 4 $\frac{1}{2}$ -inch blade.
- 1 knife, draw, 10-inch blade.
- 1 plane, iron, 2-inch blade and corrugated bottom.
- 1 pliers, pair, 6-inch.
- 1 rule, 2-foot, folding, brass-bound.
- 1 saw, crosscut, 21-inch.
- 1 saw, 26-inch, crosscut.
- 1 screw-driver, 6-inch.
- 1 square, graduated, 9-inch.
- 1 tape, metallic, 50-foot.
- 1 wrench, screw, 10-inch (opening in jaws 1 $\frac{1}{8}$ inches).

303. SERVICE TOOL BAG.

[The service tool bag is manufactured under specification No. 312.]

Equipment.

- 1 try-square, steel, 4-inch blade.
- 1 chisel, cold, $\frac{1}{2}$ -inch.
- 1 chisel, wood, $\frac{1}{2}$ -inch socket blade, iron ring topped handle.
- 1 hammer, claw, 16-ounce.
- 1 handle with tools, large size
- 1 knife, heavy jack.
- 1 level, pocket spirit, 2 $\frac{1}{2}$ -inch.
- 1 plane, block.
- 1 pair pliers, 6-inch side cutting.
- 1 pair pliers, 8-inch side cutting.
- 1 4-foot rule, folding boxwood, 8 parts.
- 1 saw, back, 8-inch.
- 1 screw-driver, 6-inch.
- 1 screw-driver, 10-inch.

- 1 pound solder, resin core.
- 1 wrench, screw, 6-inch, forged 6-inch monkey wrench.
- 1 wrench, socket, for telephone apparatus, 4-inch.
- 1 small brace, ratchet brace, good quality.
- 1 wood bit, $\frac{1}{4}$ -inch, medium quality.
- 1 wood bit, $\frac{3}{8}$ -inch, medium quality.
- 1 wood bit, $\frac{1}{2}$ -inch, medium quality.
- 1 wood bit, $\frac{3}{4}$ -inch, medium quality.
- 1 wood bit, 1-inch, medium quality.
- 1 S. P. polarity indicator.

304. INSPECTOR'S POCKET KIT.

[The inspector's pocket kit is manufactured under specification No. 186.]

Marking.

The carrying case has stamped into the leather the following:

INSPECTOR'S POCKET KIT,
U. S. SIGNAL CORPS.
No. —.

Equipment.

- 1 combined screw-driver and skinning knife with safety spring.
- 1 electrician's scissors, 5-inch, nickeled.
- 1 pair pliers, 5-inch, side cutting, nickeled, S. & H.
- 1 bastard file, 3-inch, half round, with handle.
- 1 pair tweezers, $4\frac{1}{4}$ -inch, nickeled.
- 1 screw-driver, 2-inch.
- 1 rule, 2-foot, narrow, 4-fold, boxwood, brass bound.

305. INSPECTOR'S INSTRUMENT BAG.

[This instrument bag is manufactured under specification No. 342.]

Equipment.

- 1 inspector's pocket kit.
- 1 ohmmeter, model 1905.
- 1 micrometer, graduated in $\frac{1}{1000}$ of an inch.
- 1 screw gauge.
- 1 gauge, 3-inch, outside caliper, spring nut.
- 1 gauge, inside caliper.
- 1 small buzzer.
- 1 hydrometer, round bulb, provided with a specific gravity scale.
- 1 differential telephone receiver, with head band.
- 1 wooden case containing six 4-ounce vials.
- 2 4-O dry cells.

Marking.

The bag is provided with a leather tag containing a card for initials and address of the inspector and has the letters "U. S. S. C." stamped alongside the handle near the lock.

306. SUBMARINE CABLE GEAR.

- Anchors, mushroom, ordinary. Supplied in sizes of 1, 2, $2\frac{1}{2}$, 3, 4, and 5 hundredweight.
- Anchors, mushroom, patent; (Johnson's patent removable shank) Supplied in sizes of 1, $2\frac{1}{2}$, 3, 4, and 5 hundredweight.
- Blocks, wood or iron. Specify whether plain or snatch type, number of sheaves, and length of block in inches.
- Buoys, automatic whistling. Weight, 18 hundredweight; safe load, 25 hundredweight.

Buoys, cable. Specify length and diameter or carrying capacity desired, or both. These can be obtained in capacities from 3 hundredweight to 6 tons. Specify bridle chains for same when desired.

Boats, cable, (also called cable cutters).

Blades for hacksaws; dozen. Specify length.

Bell-mouths, hinged.

Chain, bridle. Usually made up in lengths as desired and fitted with egg links at each end. Necessary to specify size of links or state breaking strain. The type is usually crane chain and size is the thickness of the link. To obtain exact duplication, also specify the outside width of the link and the pitch, which is the distance between similar points of successive links.

Charts. Give serial number and specify whether Coast and Geodetic Survey or Hydrographic Office edition.

Chronometers, marine.

Clamps, buoy lamp.

Coats, oilskin.

Counters, revolution.

Core, cable, feet. For test room connections and leads.

Couplings, for chains. Specify size and kind of coupling, whether with swivel and egg links or simply shackles.

Crinolines, cable tank. Manufactured only according to specifications for each particular case.

Cut-Meter. This is a direct reading speed indicator which can be applied to any moving surface.

Cutters, cable. A portable bolt-cutter that may be mounted on a block with handles. It is supplied for use about the decks of cable-ships.

Dividers, proportional.

Dividers, steel, navigator's.

Dynamometers, large size 25 tons strain, small size strains to 10 tons.

Frames, hacksaw. Adjustable furnished unless length is stated.

Gages, wire.

Globes, telephoto or Ardois. Specify whether red or white and name of manufacturer of outfit.

Grapnels, ordinary 5-prong can be obtained in sizes of 1, 1½, 2, 2½, 2½ long prong, 3, and 3½ hundredweight.

Grapnels, boat, weight about 23 pounds.

Grapnels, Jamieson's rock, 2 types, one having flat prongs and the other with prongs forked at shank. Type with flat prongs preferred.

Grapnels, Johnson's renewable section.

Spare prongs for same, short.

Spare prongs for same, long.

Grapnels, Lucas patent cutting and holding, complete, with knives.

Grapnels, centipede, can be obtained in sizes of ½, 1, 1½, 2, 2½, 3, and 3½ hundredweight.

Grapnels, centipede, boat, weight 30 pounds.

Grapnels, Murphy's patent centipedes, in sets of six each, consisting of 4 grapnels and 2 spare, and including 4 shackles. Can be obtained in 4 sizes, weights per section as follows: 20, 45, 55, 85 pounds each.

Hats, oilskin.

Hose, steam, flexible copper, 1½ and 2 inch sizes.

Hose, steam, 5-ply rubber, 1½ and 2 inch sizes.

Hose, steam, 8-ply rubber, wire-wound, 1½ and 2 inch sizes.

Hose-couplings. Requisitions for steam hose specify length of sections.

Hauling-off gear, steam or electric. For electric specify voltage.

Irons, calking, 3 per set.

Irons, soldering, electric. Specify voltage.

Knives, cable sheath.

Lamps, alcohol.

Lamps, buoy; can be obtained in various sizes. Ship's anchor-lights usually supplied. Specify size.

Lamp frames for attachment to flagstaves and buoy tripods.

Lamps, blow. (See "torches, blow.")

Lamps, incandescent. Specify voltage and candle power. Edison sockets will be furnished unless otherwise indicated. Straight filament lamps are supplied for testing room galvanometers. The special lamps for telephoto and Ardois must have voltage and maker's name specified.

Lanterns, tin.

Lead, red, pounds. Supplied for the preservation of cable gear. Unmixed will be supplied unless otherwise specified.

Leads, deck, several sizes and kinds of 1, 2, and 3 roller leads.

Leads, heaving, 12 and 28 pound weights.

Leather, rigging, sides. Specify thickness and quality

Lead, sounding, for Thompson machine.

Logs, taffrail, with propeller and line.

Links. Specify length, width, and size.

Machines, cable, usually classed as "pick-up," "pay-out," or "combined picking-up and paying-out." To be accounted for by name of maker.

Machines, D. S., sounding, Sigsbee.

Machines, electric, vulcanizing. Specify voltage.

Mallets, calking.

Mallets, serving, wood.

Mallets, serving, iron.

Mushrooms. (See "anchors, mushroom.")

Marline spikes.

Needles, sail, dozen.

Oil, boiled linseed, gallons.

Oil, engine, barrels.

Oil, cylinder, barrels.

Padlocks. Specify make desired and size. Usually unsatisfactory when furnished assorted.

Paint. Specify whether mixed or unmixed.

Palms, sailor's sewing.

Rope, grapnel, 6 by 3; combined wire and manila, breaking strain 15 tons; weight per thousand fathoms exclusive of fittings 55½ hundredweights.

Rope, grapnel and buoy, 4 by 4; combined wire and manila, breaking strain 13½ tons; weight per thousand fathoms exclusive of fittings 49½ hundredweights.

Rope, buoy, 3 by 3; combined wire and manila, breaking strain 7½ tons; weight per thousand fathoms exclusive of fittings 24 hundredweights.

Specify the length of sections of grapnel and buoy ropes; also that each length be equipped with proper fittings.

Rope, manila, coils. Specify size inches (circumference.) Rope supplied only in units of coils. Number of feet in a coil not fixed. 3-strand will be supplied unless 4-strand is specified.

Rotometers, Elliot (revolution counters).

Scales for T-B sounding tubes.

Sextant.

Shackles. Specify size, whether screw or pin, give size and also length and width, as some types are unsuitable for use with grapnel rope.

Sheaves. There is such a great variety of sizes and kinds that requisitions should clearly specify type and dimensions.

Spun yarn, 3 yarn.

Shots, sounding. Can be obtained in weights from 40 to 90 pounds. Should be purchased by cable ship, as required.

Splicing tool. A disk with handles for laying on armor wire.

Swivels. Can be obtained in various sizes and with various shaped links attached.

Slip-hooks (detaching hooks). Has trigger for releasing buoys. 3 sizes—small, medium, and large.

Tubes, glass, sounding, for Thompson machine, 10 tubes per case.

Tubes, sounding, Tanner-Blish, for Thompson machine, frosted glass.

Tube, brass, sounding. To attach to sounding wire and contains the glass tube.

Tube-boxes for T-B sounding tubes.

Tags, cable, linen.

Telegraphs, special. Refers to pedestal dials complete; also known as "ship's telegraph."

Requisitions for chain or pulleys specify exact size, and for the telegraphs furnish a sketch showing the lettering desired for the dial.

Telephoto outfits (Ardois). To be accounted for by number.

Thermometers, deep-sea sounding. These thermometers on being reversed when heaving in indicate the bottom temperature. Negretti & Zambra type will be supplied unless otherwise indicated.

Thermometer cases. For reversing thermometer to obtain bottom temperature.

Thimbles. Can be supplied in great variety of sizes and shapes. Galvanized iron will be supplied unless otherwise specified.

Torches, blow. Gasolene type will be furnished unless otherwise specified.

Trays, vulcanizing. These are for melting paraffine for vulcanizing joints. Can not be purchased in open market. When new one is required, old one should be furnished as a sample to manufacturer.

Waste, cotton, bales, about 100 pounds per bale.

Wire, seizing. This is a soft G. I. No. 18 for serving armor of D. S. cable.

Wire, sounding, 7-strand, for Thompson machine. Supplied in lengths of 300 fathoms.

Wire, deep-sea, sounding, fathoms. This is "No. 11 music," approximately No. 21 B. & S. gage, breaking strain about 207 pounds. Supplied in sealed tin cans containing 1,000 fathoms of wire.

Books supplied for cable testing and engineering: Signal Corps Manual No. 4, Deep-Sea Explorations (Fish Commission edition), Electrical Engineer's Pocket Book (Foster), Electrical Testing for Telegraph Engineers (Young), Submarine Cable Laying and Repairing (Wilkinson), Submarine Telegraphs (Bright), Submarine Cable Testing (Fisher & Darby), Electrical Testing (Kent).

307. PRIMARY BATTERIES.

[For description of each type see Manual No. 3.]

Cells, battery, gravity, main-line, complete. This size has a glass jar 5 by 7 inches.

Cells, battery, gravity, local, complete. This size has a glass jar about 6 by 8 inches.

The renewals for gravity cells are as follows:

Zincs, crowfoot.

Zincs, wasteless.

Jars, glass.

Coppers.

Bluestone (sulphate of copper) supplied in original packages of 25, 50, and 100 pound boxes.

Cells, battery "Gonda" complete.

Other similar types of open-circuit cells—such as "Le Clanche," "Sampson No. 2," etc.—should be accounted for in the same manner.

Cells, battery, type "V." (See Manual No. 3 for description of parts and renewals).

Cells, batteries, Fuller, complete.
 Cells, dry, No. 4, length 4 inches.
 Cells, dry, No. 4-0 length 4 inches, shape oval (buzzer size).
 Cells, dry, No. 5, length 5 inches (testing size).
 Cells, dry, No. 6, length 6 inches (telephone size).
 Cells, dry, No. 7, length 7 inches.
 Cells, dry, No. 8, length 8 inches.

306. TELEPHONES AND SWITCHBOARDS FOR GENERAL SERVICE.

TELEPHONES.

American Bell, wall, rented; American Bell, desk, rented. These telephones must be carried on property return in *red ink*, showing serial numbers of transmitters and receivers. These telephones can not be used or connected with lines or switchboards using other make of telephones.

American Bell, wall; American Bell, desk. These telephones are owned by the Signal Corps, but marked "For U. S. Govt. use only." These telephones can not be condemned and sold when unserviceable.

Cable testing.

Cut-in. This telephone is supplied for simultaneous use on telegraph lines. There is no generator or call-bell. The calling device is a loud, harsh sound from the receiver, produced by the rapid charge and discharge of condensers.

Ericsson.

Desk set, L. B. (local battery).

Desk set, Bell, L. B. (local battery).

Field, model 1904.

Field, model 1905.

Stromberg-Carlson.

Service, model 1901.

Service, model 1902.

Type E kits. No more of this type of field telephone will be supplied, but those on hand will be used while serviceable.

Wall, L. B. (local battery).

Williams.

Williams-Abbott.

Wilhelm.

SWITCHBOARDS.

Switchboard, telephone (Mfr.)—drop.

Switchboard, telephone, post. This is a 15-drop local battery, 5-pair cord, board.

Switchboard, telephone, portable cordless, complete. This has leather carrying-case, tripod and carrying-case, and ground-rod.

Telephone and telephone switchboard accessories.

Coils, choke.

Coil, telephone repeating.

Arresters, lightning, Mason, with or without fuses.

Arresters, lightning, Argus.

Arresters, lightning, fuse, spring clip.

Arresters, lightning, cabinet.

308. BUZZERS.

Buzzers, Cavalry.

Buzzers, field model 1898. This was formerly known as Type D kit; has black leather case.

Buzzers, field model 1904. This has fair leather case; buzzer magnet with hard-rubber shell.

Buzzers, field model 1905. This has fair leather case; the buzzer magnet has nickel-plated iron shell. The batteries for this type are supplied in fixed blocks of 5.

Buzzers, service. This has wooden case and brass fittings and was formerly known as Type C kit.

310. TELEGRAPH INSTRUMENTS.

Coil, resistance. This is often termed "Spark-coil."

Condensers, adjustable.

Cord, resonator.

Keys, telegraph, C. C. leg (closed circuit).

Keys, telegraph, C. C. legless (closed circuit).

Keys, telegraph, O. C. leg (open circuit).

Keys, telegraph, O. C. legless (open circuit).

Plug, cut-out, telegraph.

Pole changers. These are supplied for duplex and quadruplex telegraphy.

Relays, 150-ohm.

Relays, box-sounding. These are 150-ohm and have key mounted on base.

Relays, Frier, self-polarizing. This is a neutral relay.

Relays, polarized.

Relays, Stroh. This is a polarized relay, very similar in outside appearance to the Frier.

Can be distinguished by a horseshoe magnet in the base, the Frier having an electro-magnet instead.

Rheostat. This is an adjustable resistance box. Various sizes.

Relays, Siemens. This is a delicate relay. Not supplied for telegraph lines.

Relays, telegraph, pocket.

Repeaters, telegraph, Milliken-Hicks, complete.

Repeaters, telegraph, Weiny-Phillips, complete.

Resonators, telegraph, complete, with stand and cord.

Sounders, main-line. These are 150-ohm, and latest types have wooden carrying-case; telegraph key is mounted on the base.

Sounders, 4-ohm.

Sounders, repeating.

Switchboard, telegraph, — line.

Transmitter, Yetman typewriting.

Transmitters, telegraph, duplex.

Weston telegraph sets, complete.

311. TESTING INSTRUMENTS.

[Submarine Cable testing instruments not included.]

Requisitions should specify range of scale readings desired for testing instruments.

Ammeter, No. —.

Ammeter, Weston, portable, No. —.

Ammeter, Weston, laboratory, No. —.

Condenser—microfarad. (The capacity in microfarads or fraction thereof to be stated.)

Galvanometer, tangent, No. —.

Galvanometer, Whitney, No. —.

Galvanometer, detector.

Galvanometer, (Mfr.), No. —.

Magneto Testing Set, Linemen's.

Milli-ammeter (Mfr.), No. —.

Ohmmeter (Mfr.), No. —.

Voltmeter, Weston, portable, No. —.

Voltmeter, Weston, laboratory, No. —.

Voltmeter, No. —.

Wheatstone, bridge, (Mfr.).

312. EQUIPMENT OF SUPPLY CABINETS.

The standard equipment of the supply cabinet is as follows: The exact number of each article enumerated in the list below will be determined by the size of the installation. A full fire command of four high-power batteries will be provided with the maximum equipment.

	Number.
Anchors, star, 1½ inch, No. 10, dozen.....	1
Batteries, dry, No. 4—0.....	5 to 25
Batteries, dry, No. 6.....	5 to 25
Bells, T. I., large.....	1
Bells, T. I., small.....	1
Burrs, copper, ¼ inch.....	½
Cement, rubber, bottles.....	10
Cleats, porcelain, single groove, dozen.....	1
Condensers, 3 M. F.....	2 to 4
Fuses, D. & W., midget, 3 amperes, dozen.....	1
Fuses, D. & W., midget, 6 amperes, dozen.....	2
Fuses, D. & W., 250-volt, indicating 35 amperes.....	6
Fuses, D. & W., midget, 15 amperes, dozen.....	1
Fuses, mica, standard.....	20 to 30
Lamps, 16 c'p., ½ dozen.....	1
Rubber, pink, rolls.....	1
Rubber, pure, rolls.....	1
Screws, brass, wood, 3-inch, No. 24 F. H., dozen.....	1
Screws, brass, wood, gross—	
¾-inch, No. 6, F. H.....	1
¾-inch, No. 6, R. H.....	1
1-inch, No. 8, F. H.....	1
1-inch, No. 8, R. H.....	1
1½-inch, No. 10, R. H.....	1
1½-inch, No. 12, R. H.....	1
Screws, machine, assorted, gross.....	1
Solder, resin, pounds.....	5
Switch, knife, D. P. S. T.....	1
Switch, knife, D. P. D. T.....	1
Switchboard, distributing, parts for as follows:	
Extension plugs and cords in assorted sizes.....	3
Jacks.....	6
U-plugs.....	6
Green glass shade for lamps.....	2
Switchboard, telephone, parts for:	
Drop for fire-commander switchboard.....	1
Drop for standard telephone switchboard.....	1
Plugs and cords for telephone switchboard.....	2
Tape, friction, pounds.....	1
Telautograph parts as follows:	
Paper, manila, rolls, gross (251).....	1 to 2
Packet of aniline color, dozen (253).....	½
Pencils, lead, boxes (254).....	2 to 4
Miscellaneous parts: List to be supplied later.	
Plug and cable, model 1904.....	2
Sockets.....	1
Sockets, contacts with screws.....	12

Telephone parts:	Number.
Breast sets, spare.....	1
Breast sets, horns for.....	12
Breast sets, cords for.....	6
Hand sets, spare.....	1
Hand sets, mouthpieces for.....	6
Hand set, cords for, dozen.....	$\frac{1}{2}$
Hand set, branch cords for, dozen.....	$\frac{1}{2}$
Head sets, spare.....	1
Head sets, horns for.....	12
Motor generator, brushes for, dozen.....	$\frac{1}{2}$
Telephone plug and cable.....	2
Telephone receiver, hand, spare.....	1
Telephone receivers, hand, spare, cords for.....	6
Telephone receiver, head, spare.....	1
Telephone receiver, head, spare, cords for.....	3
Telephone retardation coil.....	2
Straps for breast set.....	2
Terminal blocks.....	2
Telephone generator, 3-bar.....	1
Telephone generator, 5-bar.....	1
Telephone cranks.....	1
Hook switch, complete.....	1
Tips, cord, dozen.....	1
Posts, binding, line.....	6
Ringer.....	1
Posts, binding, extension.....	6
Coils, induction.....	2
Wire, assorted, in color scheme, for repairs, feet.....	50
Watch, stop.....	1
Terminal strips.....	1
Forming strips.....	1
Service tool bags.....	1
Voltmeter, in leather case <i>a</i>	1
Voltmeter, standard <i>a</i>	1
Waste, cotton, pounds.....	5
Lineman's magneto testing set with receiver.....	1

All of the foregoing equipment will be provided in the supply cabinet proper in properly-labeled drawers.

In addition to this equipment and incidental to the supply cabinet there will be provided a galvanized-iron bucket for use of waste, which will be mounted clear of the floor on galvanized-iron legs. A pint copper squirt can and a gallon can of heavy dynamo oil, provided with a copper tray, will be provided, located separate from combustibles and in an open part of the room.

a In case the post is already supplied with a standard voltmeter and voltmeter these will be omitted.

Article VIII.

CABLES.

MARKINGS ON CABLE REELS.

313. Each reel of standard Signal Corps cable bears a serial brass tag marked with the letters "S. C." and a serial number. This brass tag is used for the purpose of identifying the cable originally placed on the reel and is not a part of the reel.

When the cable has been removed from a reel, the tag should be at once removed and destroyed, care being taken to record in each case the location of the cable to which the tag belongs. It is essential to the records of the Signal Corps that this rule should be closely followed, and that in no case should the cable be carried from a reel bearing one number to a reel bearing a different number.

314. In special cases where the reels are of considerable value, as, for example, in types 306, 307, 308, and 309, a report should be made to the chief signal officer of the department indicating that the reel bearing tag No. — is empty and is ready for return to the manufacturer, care being taken to so mark the reel that its identity may be retained after the tag is destroyed.

315. In ordinary cases it is desirable to group reels which have borne numbers in a series, or nearly so, together while in storage, so that in case it is necessary to return them to the manufacturer there may be no confusion.

316. When a cable is transferred from original reel to another reel, its tag should accompany it, and all other tags on the reel to which it is transferred should be destroyed.

317. In all cases the tags must be destroyed as soon as a cable is removed from its reel.

CABLE REPAIRS.

318. In the future when repairs are made on Signal Corps cables in which there are faults, the party repairing the fault will send direct to the office of the Chief Signal Officer of the Army a piece of the core containing this fault—about 6 inches in length—with a brief statement of the circumstances under which the fault was discovered and repaired.

Whenever in the location of the fault it is necessarily burned out to such an extent as to render the original trouble unrecognizable, it should be so stated in the report accompanying the piece of core.

319. Whenever a cable is broken by an anchor or other means, the piece of the core at the broken ends will be sent in.

320. Whenever a cable or other material forming part of the sea-coast defenses of the United States is fouled by a passing vessel, the commanding officer of the post or station to whose knowledge the fact is brought will make prompt report by telegraph direct to the Military Secretary of the Army of the name and nationality of the vessel concerned and the nature and extent of the damage done by it, in order that the matter may be placed in the hands of the Department of Justice. The commanding officer will send a copy of his report to the department commander.

OFFICIAL NUMBERS OF CABLES LAID.

321. Every section of Signal Corps cable is assigned an official number by the Chief Signal Officer of the Army when the cable is laid. When two or more sections of cables are later joined through permanently, a new number is assigned; also, when any section is divided to cut in an intermediate office.

Numbers from 1 to 100 are assigned to cables outside of the United States, and from 101 upward to cables in the United States.

TYPES.

322. The Signal Corps cables manufactured to date are divided into six classes, viz:

Rubber insulated submarine, serial type numbers, 1 to 200.

Rubber insulated subterranean, serial type numbers, 201 to 300.

Paper insulated armored, serial type numbers, 301 to 400.

Paper insulated, aerial, unarmored, serial type numbers, 401 to 500.

Special types, serial type numbers, 501 to 600.

Power cables, serial type numbers 601 to 700.

323. Description of types of rubber-insulated submarine cables.

Type No.	Specification No.	Kind.	Conductor.					Armor No. B. W. G.
			Date.	Number.	Strand.	B. & S. gauge.	Insulation.	
							In.	
1		Deep-sea, 1 conductor, Philippines.....	1899		7	24	$\frac{3}{32}$	12
			1900		7	24	$\frac{3}{32}$	12
2		Shore end, 1 conductor, Philippines.....	1899		7	24	$\frac{3}{32}$	6
			1900		7	24	$\frac{3}{32}$	6
3	1	Deep-sea, Philippines.....	1899		7	21	$\frac{3}{32}$	10
			1900		7	21	$\frac{3}{32}$	11
4	9	Experimental, light.....	1901		7	24	$\frac{3}{32}$	18
5	10	2-conductor.....	1901		7	24	$\frac{3}{32}$	7
6	7	5-conductor, 1-pair, 3-straight.....	1901	2	7	24	$\frac{3}{32}$	9
				3	7	21	$\frac{3}{32}$	
7	7	7-conductor, 2-pair, 3-straight.....	1901	4	7	24	$\frac{3}{32}$	7
				3	7	21	$\frac{3}{32}$	
8	7	9-conductor, 3-pair, 3-straight.....	1901	3	7	21	$\frac{3}{32}$	6
				6	7	24	$\frac{3}{32}$	
9	7	11-conductor, 4-pair, 3-straight.....	1901	3	7	21	$\frac{3}{32}$	6
				8	7	24	$\frac{3}{32}$	
10	7	13-conductor, 3-straight, 5-pair.....	1901	3	7	21	$\frac{3}{32}$	5
				10	7	24	$\frac{3}{32}$	
11	7	17-conductor, 7-pair, 3-straight.....	1901	3	7	21	$\frac{3}{32}$	5
				14	7	24	$\frac{3}{32}$	
12	15	1-conductor.....	1902		7	21	$\frac{3}{32}$	10
13	16	3-conductor, San Francisco.....	1902		7	21	$\frac{3}{32}$	12.5
14	17	4-conductor, New London.....	1902		7	21	$\frac{3}{32}$	9
15	17	2-conductor.....	1902		7	21	$\frac{3}{32}$	9
16	17	1-conductor.....	1902		7	21	$\frac{3}{32}$	10
17	2	1-conductor, Int., Alaskan.....	1903		9	23	$\frac{3}{32}$	8
				1	9	23	$\frac{3}{32}$	
18	3	2-conductor, Int., Alaskan.....	1903		9	23	$\frac{3}{32}$	8
				1	9	23	$\frac{3}{32}$	
19	4	1-conductor, rock, Alaskan.....	1903		9	23	$\frac{3}{32}$	8
				1	9	23	$\frac{3}{32}$	3
20	5	1-conductor, shore end, Alaskan.....	1903		9	23	$\frac{3}{32}$	8
				1	9	23	$\frac{3}{32}$	3
21	6	1-conductor, deep-sea, Alaskan.....	1903		9	23	$\frac{3}{32}$	13
				1	9	23	$\frac{3}{32}$	
22	14	F. C., Portland, 4-pair.....	1903		7	24	$\frac{3}{32}$	8
23	14	F. C., Portland, 4-pair, and 4-straight.....	1903	4	7	21	$\frac{3}{32}$	6
				8	7	24	$\frac{3}{32}$	
24	14	F. C., Portland, 2-pair, and 4-straight.....	1903	4	7	21	$\frac{3}{32}$	9
				4	7	24	$\frac{3}{32}$	
25	14	F. C., Portland, 3-pair, and 3-straight.....	1903	2	7	21	$\frac{3}{32}$	8
				7	7	24	$\frac{3}{32}$	
26	14	4-pair, 3-straight.....	1903	3	7	21	$\frac{3}{32}$	6
				8	7	21	$\frac{3}{32}$	
27	14	4-pair, 4-straight.....	1903	9	7	24	$\frac{3}{32}$	6
				3	7	21	$\frac{3}{32}$	
28	14	2-pair.....	1903		7	24	$\frac{3}{32}$	11
29	338	1-conductor, F. C.....	1905		7	21	$\frac{3}{32}$	11
30	338	2-pair, F. C.....	1905		7	24	$\frac{3}{32}$	11
31	338	3-pair, F. C.....	1905		7	24	$\frac{3}{32}$	9
32	338	4-pair, F. C.....	1905		7	24	$\frac{3}{32}$	8
33	338	5-pair, F. C.....	1905		7	24	$\frac{3}{32}$	6
34	338	6-pair, F. C.....	1905		7	24	$\frac{3}{32}$	6
35	330	1-conductor, deep-sea, Alaskan.....	1905		9	23	$\frac{3}{32}$	13
				1	9	23	$\frac{3}{32}$	
36	331	1-conductor, Int., Alaskan.....	1905		9	23	$\frac{3}{32}$	8
				1	9	23	$\frac{3}{32}$	
37	332	1-conductor, shore end, Alaskan.....	1905		9	23	$\frac{3}{32}$	3
				1	9	23	$\frac{3}{32}$	
38	333	1-conductor, deep-sea, Philippines.....	1905		7	21	$\frac{3}{32}$	10
39	333	1-conductor, shore end, Philippines.....	1905		7	21	$\frac{3}{32}$	10.6
40	334	1-conductor, special, light.....	1905		7	24	$\frac{3}{32}$	18
41	338	2-conductor, F. C.....	1905		7	24	$\frac{3}{32}$	11
42	374	3-pair, special.....	1905		7	21	$\frac{3}{32}$	9
43	375	3-pair, special.....	1905		7	21	$\frac{3}{32}$	5.9

aB. & S. gauge.

Submarine cables for deep sea are usually delivered in lengths of not less than 15 miles.

Fire-control cables are usually furnished on reels in the following lengths:

Types 29, 30, and 41 in lengths of 2 miles.

Types 31 and 32 in lengths of 1 mile.

Types 33 and 34 in lengths of one-half mile.

The standard deep-sea single-conductor cable as indicated in types 3, 16, and 38 will weigh approximately 3,000 pounds to the mile.

The weight of the standard fire-control cables per statute mile is approximately as follows:

Type 29, 2,800 pounds.

Type 30, 10,000 pounds.

Type 31, 12,500 pounds.

Type 32, 15,000 pounds.

Type 33, 21,000 pounds.

Type 34, 25,000 pounds.

Type 41, 6,000 pounds.

The Alaskan cables weigh approximately per statute mile as follows:

Type 35, 3,425 pounds.

Type 36, 5,450 pounds.

Type 37, 20,000 pounds.

324. *Description of types of rubber-insulated subterranean cables.*

Type No.	Specification No.	Kind.	Date.	Conductor.			Insulation.	Armor No. B. W. G.
				Number.	Strand.	B. & S. gauge.		
201		1-pair, lead-covered.....	1902			18	<i>In.</i>	Lead.
202		3-pair, lead-covered.....	1902			18	$\frac{5}{32}$	Do.
203		5-pair, lead-covered.....	1902			18	$\frac{5}{32}$	Do.
204		6-pair and 8-straight, lead-covered.....	1902			18	$\frac{5}{32}$	Do.
205		5-pair, lead-covered, and armored.....	1902			18	$\frac{5}{32}$	10 and lead.
206		6-pair and 8-straight, lead-covered and armored.....	1902			18	$\frac{5}{32}$	9 and lead.
207	12	1-pair, lead-covered.....	1902			14	$\frac{5}{32}$	Lead.
208	12	3-pair, lead-covered.....	1902			14	$\frac{5}{32}$	Do.
209	12	6-pair, lead-covered.....	1902			14	$\frac{5}{32}$	Do.
210	12	8-pair and 8-straight.....	1902			14	$\frac{5}{32}$	Do.
211	13	6-pair, lead-covered and armored.....	1902			14	$\frac{5}{32}$	10 and lead.
212	13	8-pair and 8-straight, lead-covered and armored.....	1902			14	$\frac{5}{32}$	9 and lead.
213	335	1-pair, lead-covered.....	1905		7	24	$\frac{5}{32}$	Lead.
214	335	3-pair, lead-covered.....	1905		7	24	$\frac{5}{32}$	Do.
215	335	6-pair, lead-covered.....	1905		7	24	$\frac{5}{32}$	Do.
216	335	12-pair, lead-covered.....	1905		7	24	$\frac{5}{32}$	Do.
217	336	6-pair, lead-covered and armored.....	1905		7	24	$\frac{5}{32}$	14 and lead.
218	336	12-pair, lead-covered and armored.....	1905		7	24	$\frac{5}{32}$	9 and lead.

These rubber-insulated subterranean cables are furnished on reels, as follows:

Types 213 and 214 in one-half mile lengths.

Types 215, 216, 217, and 218 in lengths of 1,000 feet.

The weight of the standard cables per statute mile is as follows:

Type 213, 3,000 pounds.

Type 214, 9,200 pounds.

Type 215, 11,100 pounds.

Type 216, 14,785 pounds.

Type 217, 18,800 pounds.

Type 218, 26,900 pounds.

The usual reel for the shipment of these types of cable weighs 400 pounds, has a length of 30 inches, a drum diameter of 34 inches, and sides 5 feet 6 inches high.

325. Types of paper-insulated armored cables.

Type No.	Specification No.	Kind.	Date.	Conductor, No. B. & S.	Insulation.	Armor, No. B. W. G.
301	8	10-pair.....	1901	19	Double, paper..	9 and lead.
302	129	25-pair.....	1904	19	.....do.....	'1 and lead.
303	174	20-pair, combination.....	1904	<div style="display: inline-block; vertical-align: middle;"> <div style="display: flex; align-items: center;"> <div style="font-size: 2em; margin-right: 5px;">{</div> <div> 8-pair-19 12-pair-3-21 10-pair-19 15-pair-3-21 </div> </div> </div>	.....do.....	9 and lead.
304	174	25-pair, combination.....	1904		.....do.....	Do.
305	339	5-pair.....	1905		.....do.....	11 and lead.
306	339	10-pair.....	1905	19	.....do.....	Do.
307	339	15-pair.....	1905	19	.....do.....	Do.
308	339	20-pair.....	1905	19	.....do.....	9 and lead.
309	339	25-pair.....	1905	19	.....do.....	Do.
310	339	30-pair.....	1905	19	.....do.....	Do.
311	339	50-pair.....	1905	19	.....do.....	6 and lead.
312	237	5-pair.....	1905	19	.....do.....	Double, lead.
313	237	10-pair.....	1905	19	.....do.....	Do.
314	237	15-pair.....	1905	19	.....do.....	Do.
315	237	25-pair.....	1905	19	.....do.....	Do.
316	237	30-pair.....	1905	19	.....do.....	Do.
317	237	50-pair.....	1905	19	.....do.....	Do.
318	372	5-pair, special.....	1905	19	.....do.....	9
319	373	.....do.....	1905	19	.....do.....	6, 9

The armored paper-insulated cables are supplied under certain conditions for submarine work. They may also be used for subterranean work.

Type 303 weighs 22,600 pounds per statute mile.

Type 304 weighs 25,000 pounds per statute mile.

Types 303 and 304 when shipped in mile lengths are provided with reels weighing 5,000 pounds, having a length of 7 feet, a diameter of side of 8 feet, and a shaft 5 inches in diameter and 10 feet long.

These cables are usually ordered in lengths to suit the installation for which they are designed, so as to be installed without splices.

326. Description of types of paper-insulated unarmored cables.

Type No.	Specification No.	Kind.	Date.	Conductor.			Insulation.
				Number.	Strands.	B. & S. gauge.	
401	197	10-pair, aerial	1904			19	Double, paper.
402	197	15-pair, aerial	1904			19	Do.
403	197	20-pair, aerial	1904			19	Do.
404	197	25-pair, aerial	1904			19	Do.
405	197	30-pair, aerial	1904			19	Do.
406	197	40-pair, aerial	1904			19	Do.
407	197	50-pair, aerial	1904			19	Do.
408	197	75-pair, aerial	1904			19	Do.
409	197	100-pair, aerial	1904			19	Do.

This class of cable, which is used for temporary fire-control work and for permanent post construction, is furnished on reels in lengths of 1,000 feet.

The table below indicates the approximate weights of this type of cable and its reels:

Type No.	Weight per statute mile.	Length.	Reels, diameter side.	Weight.	Gross weight (1,000 feet of cable and reel)
	Pounds.	Inches.	Inches.	Pounds.	Pounds.
401	6,200	33	56	600	1,770
402	7,000	33	56	600	2,000
403	8,200	33	56	600	2,140
404	8,900	33	60	800	2,490
405	10,500	33	60	800	2,900
406	13,000	33	64	950	3,500
407	16,600	33	64	950	4,100
408	20,000	33	72	1,100	4,800
409	24,000	33	72	1,100	5,740

TYPES OF POWER CABLES.**327. Braided cable.**

Type No.	Circular Mils.	No. of wires in strand.	Gauge No. of single wires.	Length on reel.	Type No.	Circular Mils.	No. of wires in strand.	Gauge No. of single wires.	Length on reel.
				Feet.					Feet.
601	4,007	1	14 B. & S....	2,000	610	80,275	19	16 B. W. G..	1,000
602	6,529	1	12 B. & S....	2,000			1	15 B. W. G..	
603	10,381	1	10 B. & S....	1,000	611	106,500	6	12 B. & S....	1,000
604	18,000	7	16 B. & S....	1,000			12	15 B. W. G..	
605	28,600	1	15 B. & S....	1,500			1	12 B. & S....	
		6	16 B. W. G..	1,500	612	134,200	6	11 B. & S....	1,000
606	35,300	1	do	1,500			12	12 B. & S....	
		6	15 B. W. G..	1,500	613	167,500	5	11 B. & S....	1,000
607	44,300	1	do	1,500			14	13 B. W. G..	
		6	12 B. & S....	1,500	614	216,900	1	10 B. & S....	
608	55,900	1	do	1,500			6	12 B. W. G..	1,000
		6	11 B. & S....	1,500			13	10 B. & S....	
609	70,600	1	do	1,000					
		6	10 B. & S....	1,000					

TYPES OF POWER CABLES—Continued.

328. Single lead-covered cable.

Type No.	Kind.	Thick-ness of lead.
		<i>Inch.</i>
621	Same as 601, Table I.....	$\frac{3}{4}$
622	Same as 602, Table I.....	$\frac{3}{4}$
623	Same as 603, Table I.....	$\frac{3}{4}$
624	Same as 604, Table I.....	$\frac{3}{4}$
625	Same as 605, Table I.....	$\frac{3}{4}$
626	Same as 606, Table I.....	$\frac{3}{4}$
627	Same as 607, Table I.....	$\frac{3}{4}$
628	Same as 608, Table I.....	$\frac{3}{4}$
629	Same as 609, Table I.....	$\frac{3}{4}$
630	Same as 610, Table I.....	$\frac{3}{4}$
631	Same as 611, Table I.....	$\frac{3}{4}$
632	Same as 612, Table I.....	$\frac{3}{4}$
633	Same as 613, Table I.....	$\frac{3}{4}$
634	Same as 614, Table I.....	$\frac{3}{4}$

329. Duplex lead-covered cable.

Type No.	Kind.	Length on reel.	Thick-ness of lead.
		<i>Feet.</i>	<i>Inches.</i>
641	Same as 601, Table I, except "length on reel".....	1,000	$\frac{3}{4}$
642	Same as 602, Table I, except "length on reel".....	1,000	$\frac{3}{4}$
643	Same as 603, Table I, except "length on reel".....	500	$\frac{3}{4}$
643a			
644	Same as 604, Table I, except "length on reel".....	500	$\frac{3}{4}$
645	Same as 605, Table I, except "length on reel".....	500	$\frac{3}{4}$
646	Same as 606, Table I, except "length on reel".....	500	$\frac{3}{4}$
647	Same as 607, Table I, except "length on reel".....	500	$\frac{3}{4}$
648	Same as 608, Table I, except "length on reel".....	500	$\frac{3}{4}$
649	Same as 609, Table I, except "length on reel".....	500	$\frac{3}{4}$
650	Same as 610, Table I, except "length on reel".....	500	$\frac{3}{4}$
651	Same as 611, Table I, except "length on reel".....	500	$\frac{3}{4}$
652	Same as 612, Table I, except "length on reel".....	500	$\frac{3}{4}$
653	Same as 613, Table I, except "length on reel".....	500	$\frac{3}{4}$
654	Same as 614, Table I, except "length on reel".....	500	$\frac{3}{4}$

Type 643a is special; conforms to type 643 in general requirements, but is supplied with four No. 10 instead of two No. 10 conductors.

330. Armored cable.

Type No.	Kind.	Length on reel.	Thick-ness of lead.	Armor wire.
		<i>Feet.</i>	<i>Inches.</i>	
661	Same as 601, Table I, except "length on reel".....	1,000	$\frac{3}{4}$	11 B. W. G.
662	Same as 602, Table I, except "length on reel".....	1,000	$\frac{3}{4}$	Do.
663	Same as 603, Table I, except "length on reel".....	500	$\frac{3}{4}$	Do.
663a				
664	Same as 604, Table I, except "length on reel".....	500	$\frac{3}{4}$	Do.
665	Same as 605, Table I, except "length on reel".....	500	$\frac{3}{4}$	9 B. W. G.
666	Same as 606, Table I, except "length on reel".....	500	$\frac{3}{4}$	Do.
667	Same as 607, Table I, except "length on reel".....	500	$\frac{3}{4}$	Do.
668	Same as 608, Table I, except "length on reel".....	500	$\frac{3}{4}$	Do.
669	Same as 609, Table I, except "length on reel".....	500	$\frac{3}{4}$	Do.
670	Same as 610, Table I, except "length on reel".....	500	$\frac{3}{4}$	8 B. W. G.
671	Same as 611, Table I, except "length on reel".....	500	$\frac{3}{4}$	Do.
672	Same as 612, Table I, except "length on reel".....	500	$\frac{3}{4}$	Do.
673	Same as 613, Table I, except "length on reel".....	500	$\frac{3}{4}$	Do.
674	Same as 614, Table I, except "length on reel".....	500	$\frac{3}{4}$	Do.

Type 663a is special; conforms to type 663 in general requirements, but is supplied with four No. 10 instead of two No. 10 conductors.

Article IX.

MISCELLANEOUS EQUIPMENT.

POST TELEPHONE SYSTEMS.

ALLOWANCE.

331. For administrative purposes post telephonic communication is authorized as shown by General Orders 175, series 1905.

332. When the Quartermaster's Department finds it necessary to contract for telephonic communication from a nearby town to the offices of the commanding officer, the quartermaster, and the commissary through a commercial telephone company, the Signal Corps upon proper notification will construct a line from the central switchboard to the reservation line where connection will be made to the Signal Corps wires, and all commercial line service will be through the central post exchange. In no case will more than one commercial company be allowed connection with the Government line on a military post at one time.

333. At large posts where complete private telephone service is desired in addition to that provided by the Signal Department, a revocable license will be prepared for the approval of the Secretary of War covering completely the conditions under which the poles may be erected, the wires strung, and the exchange service regulated, or the whole plant removed when required. This service will be permitted in no case without the approval of the Secretary of War and be made an entirely separate installation from the Government lines.

334. Telephonic installations for rifle ranges, fire-control purposes, War College, and service schools are not included in the above. They are provided for separately, according to the necessities of the occasion.

335. Post telephonic systems are to be maintained and operated by the members of the garrison as a rule, such systems to be inspected by a Signal Corps or other available expert at least twice each year.

INSPECTIONS.

336. The inspector of Signal Corps telephone systems will, in all cases, report as herein prescribed. Any additional data should be entered under "Remarks." The report should, in all cases, be specific, setting forth in nontechnical language the exact condition of the installation.

This report will be forwarded in duplicate to the chief signal officer of the department in which the inspection is made. Where minor defects exist it is desired that the inspector see to it that the necessary changes are made while he is on the ground. Where a general reconstruction is necessary care must be taken to state specifically what is required to bring the system up to a proper state of efficiency, it being intended that all installations shall be made to be first class in every particular.

337. The instrumental and switchboard equipment for repairs should, in all cases, conform strictly to the existing equipment.

The switchboard and instrumental equipment for construction, however, may conform to the latest type of apparatus.

The estimate for line reconstruction in this case would, of course, be for metallic lines and aerial cables with first-class construction in every particular.

338. The report shall include the following:

First. Name of station.

Second. Date of inspection.

Third. Number, make, and Signal Corps serial numbers of wall telephones.

Fourth. Number, make, and Signal Corps serial numbers of desk telephones.

Fifth. Type, make, and Signal Corps serial number, with equipment of line and cord circuits, of the telephone switchboard.

Sixth. Character of switchboard protectors.

Seventh. Make and number of lightning arresters, protectors, and fuses.

Eighth. Make and number of instrument arresters (if separate).

Ninth. Specific statement concerning the number and location of instruments in excess and instruments lacking as per G. O., No. 175, War Department, 1905.

Tenth. Whether operated on common or local battery.

Eleventh. Number of metallic circuits (and whether separate or party.)

Twelfth. Number of grounded circuits.

Thirteenth. Lines, type, and construction, whether open wire, aerial cable, or subterranean cable. Kind of poles, whether wood or iron. Kind of line wire, whether galvanized iron or copper.

Fourteenth. Condition of switchboard equipment: Indicate exactly what defects exist with probable cause. Indicate need, if any, for replacement of board or renewal of any part of the switchboard equipment.

Fifteenth. Condition of switchboard protectors: Indicate exactly what defects, if any, exist and the necessity for renewal or replacement.

Sixteenth. Condition of line: Indicate specifically what defects, if any, exist and recommend definitely what changes should be made for its improvement with the approximate amount of material and labor required to accomplish it.

Seventeenth. Condition of instruments: Indicate any defects that may exist in instrument wiring or installation, with recommendations for radical changes, if such are necessary. Indicate necessity for replacement, if such necessity exists, and arrange for renewal of transmitters, receivers, and ringers, if any are found to be defective. (This renewal may be made by the post authorities through the regular channels, but no repairs should be attempted by them on instrument parts.)

Eighteenth. Condition of instrument protectors: Indicate necessity for replacement or renewal. Indicate necessity for new ground or new location of instruments.

389. APPROVED EQUIPMENT SUPPLIED.

[See Signal Corps Manual No. 3, Revised, for line construction and description of apparatus.]

A 15-drop local battery post telephone switchboard has been adopted for this service; but some 10-drop and 20-drop, on hand, may also be utilized.

Each switchboard must be protected from damage by lightning, and a lightning-arrester cabinet is supplied for this purpose.

Fifteen feet of standard switchboard cable, 20-pair, is supplied to connect the switchboard to the lightning-arrester cabinet. The lightning-arrester cabinet contains fifteen Mason lightning arresters with fuses.

The switchboard is usually located in the administrative building at each post.

A piece of 15-pair lead-covered paper cable is supplied to connect from the lightning-arrester cabinet to the distributing pole outside, length depending upon local conditions. This lead-covered paper cable must be pot-headed at each end, and for this purpose the following materials are supplied for the two pot-heads.

2 lead sleeves, 2 by 18 inches.

50 paper sleeves, 3 inches by $\frac{1}{8}$ inch.

125 feet pot-head wire.

One-half gallon ozite.

5-pound ingot plumbers' wiping solder.

A detailed description of pot-heading is given in Signal Corps Manual No. 3, 1905 edition. If no man can be found at the post who is competent to do pot-heading, authority should be requested to hire such a man to make the two pot-heads, and one can probably be secured from a local telephone company.

A suitable length of one-fourth-inch messenger strand is supplied to support this lead-covered cable between the building and the distributing pole outside. Two messenger supports, four standard lag screws, one-half inch, and thirty-two marline hangers are also furnished.

At the distributing pole a special type of waterproof terminal box is supplied, having two strips of 15-pair. A pole seat is supplied for each terminal box.

Wherever nearly all the wires from the switchboard room are in the same direction, a 15-pair or 10-pair cable is supplied. For the end of this cable another waterproof terminal box is supplied.

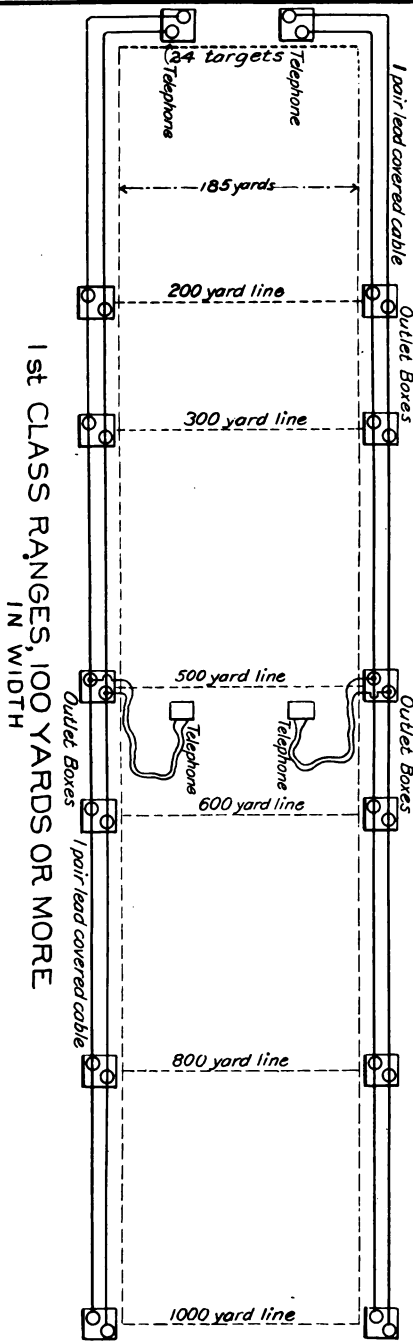
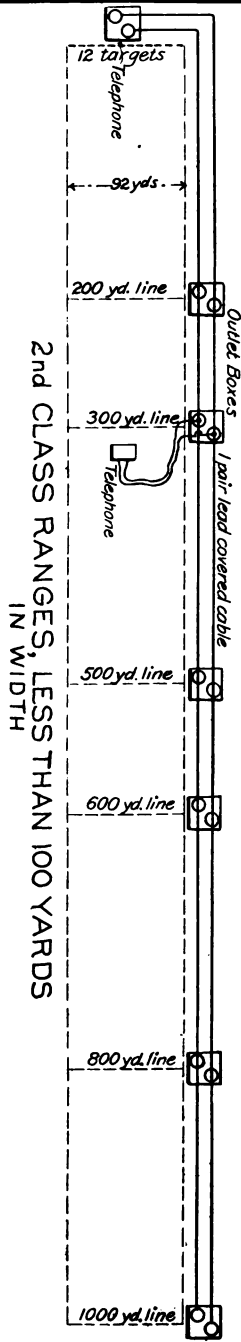
From the end of the lead-covered cable the outside construction will be No. 14 G. I. wire, wood poles, cross arms and pins, and glass insulators. Outside twisted pair is supplied only for connection from pole line to buildings for each telephone.

For such small number of wires heavy guying of poles will be unnecessary, and No. 9 G. I. wire will be supplied for guys. In most cases a "*dead man*" will be buried instead of patent anchors in guying.



TELEPHONE CIRCUITS FOR TARGET RANGES

Scale, 1 inch = 150 yards



Poles will be of wood and in most cases are to be cut or purchased in the vicinity of the post.

Inside twisted pair is supplied for inside wiring to telephones, and must in all cases be neatly secured with porcelain cleats, and no staples or double-pointed tacks will be permitted in any case. Each telephone must be supplied with a Mason or other suitable lightning arrester.

No. 6 size standard dry battery is supplied for all telephones and switchboard operator's telephone. Renewal parts for wet cells in use will be continued as long as such cells last.

It is expected that the post signal officer will arrange to secure prisoners or other labor for digging holes and erecting poles.

340. Telephone reports shall be rendered semiannually on the "Semiannual report of telephones," (Form No. 209), in accordance with the printed instructions thereon.

RIFLE RANGE EQUIPMENT.

341. The following is the standard of Signal Corps telephone equipment for target ranges for small-arms practice:

Signal officers of departments should see that requisitions are made for sufficient material to provide a standard equipment for all target ranges within their departments.

Signal corps supplies for target ranges differing from the standard herewith set forth will not be furnished except on the special approval of the Chief Signal Officer of the Army for reasons which must be satisfactory to the Chief of Staff.

It is assumed that ranges will be equipped with targets varying in number from two to twenty-four and that the purpose of the telephone communication is to enable men firing to communicate with the markers on such occasions as may be necessary to note a failure to mark, a miss, an improper position of the target, or other incidental events not requiring any extended or considerable amount of conversation over telephones on the range.

Ranges are divided into two classes, the first having a width of more than 100 yards, and the second class a width of 100 yards or less. First-class ranges will have the range office connected with the target pits by two single-pair lead-covered cables, one at the right side and the other at the left side of the range. The cables are to be buried in a trench not less than 15 inches deep and covered first with a board at least 1 inch thick and 6 inches wide, and then with earth.

Each firing point (at 100 yards, 200 yards, etc.) will be provided with an outlet-box for the purpose of furnishing telephonic communication with any desired point on the range. Local connections are to be made by a flexible cord, one twisted pair of sufficient length to permit a field telephone to be carried to any desired position on the firing point.

Telephones with plug will enable the range officer to establish communication between the range office, the target pits, and any firing point on the range where practice may be taking place.

Ranges of the second class, 100 yards or less in width, will be equipped in the same manner, except that one cable only will be furnished.

There will also be suitable stationary boxes to protect telephones placed in the rear of the targets and portable boxes for protecting the field telephones while they are being used on the firing line, the latter boxes to hold the portable cord when not in use.

Under these conditions it will be practicable to bridge on an additional telephone or two at the outlet-box on the firing point and also at the terminus of the cable in the target pits should it be necessary or desirable to simultaneously maintain communication from the firing point with the range office and the target pits.

342. The following standard Signal Corps telephone equipment for target ranges is usually furnished:

First class range:

- Cable, lead covered, 1 pair. (A line of subterranean cable to extend down each side of the range, the length on each side to be the length of the range plus two-thirds its width.)
- 12 outlet boxes (one at each firing point on both sides of the range).
- 2 portable telephone boxes.
- 2 portable telephone cords (each cord to be in length about one third the width of the range).
- 2 service telephones for target pits.
- 2 field telephones (portable) for use at firing points.
- 2 rolls friction tape.

Second class range:

- Cable, lead covered, 1 pair (a line of subterranean cable to extend down one side of the range. The length will be the length of the range plus two-thirds its width).
- 6 outlet boxes (one at each firing point).
- 1 portable telephone box.
- 1 service telephone for target pit.
- 1 field telephone (portable) for firing point.
- 1 roll friction tape.

Necessary lumber to build the trench in which the cable is buried is usually supplied by the Quartermaster's Department.

PHOTOGRAPHIC OUTFITS.

343. With the view of having a limited number of sergeants of the Signal Corps located at various points skilled in and equipped for ordinary photographic work in case of military or other necessity a few photographic outfits will be provided for distribution to such sergeants as may be designated by the Chief Signal Officer of the Army. This equipment will consist of the following articles, to be accounted for on

property return, but will be retained by the sergeant when changing station, unless otherwise directed by the Chief Signal Officer:

- 1 Premo camera No. 6 (5 by 7), with Bausch & Lomb, Zeiss, series 7 A lens, with shutter and carrying case.
- 6 plate holders, double.
- 1 lamp, ruby.
- 1 focusing cloth, rubber.
- 1 tripod, folding.
- 2 printing frames, 5 by 7
- 3 trays, H. R., 7 by 9.
- 1 negative rack.
- 1 fixing bath, H. R., 5 by 7.
- 1 washing box, zinc, negative, 5 by 7.
- 2 graduates, glass, minimum, and 16-ounce.
- 1 scales, photo., Fairbanks.

A small supply of plates, paper, and chemicals will also be issued.

344. As developing-papers do not deteriorate as quickly as printing-out papers, only paper of the former character will be supplied. The chemicals furnished will be confined exclusively for developing plates and prints.

345. Sergeants intrusted with photographic outfits will use the utmost economy in the consumption of material consistent with public interests.

346. A detailed monthly report will be made to the Chief Signal Officer of the Army covering work performed and giving a list of all negatives made. This report will be accompanied by two unmounted prints of each view of military or general interest, including such others as may show progress.

347. Negatives and corresponding prints will be serially numbered on the lower left-hand corner, and prints accompanied by an index card or sheet setting forth title of view, location, date made, name of operator, and other pertinent data necessary to make the historical record complete. All negatives will be the property of the Signal Corps and will be retained by the sergeant until a sufficient number are collected, when instructions will be given for their disposition.

SUBMARINE CABLE INSTRUMENTS.

348. Instruments for operating and testing submarine cables are furnished in special types for each particular station. Signal Corps Manual No. 4, 1905 edition, gives a complete description of this class of instruments and should be referred to for any information on the subject.

BALLOONS.

349. The Signal Corps has no standard balloon equipment at present, and it is not probable that articles of balloon equipment will at any time be generally distributed to various storehouses or posts.

350. Balloons are very expensive and great care must be exercised in storage to prevent rapid deterioration. A cool dry place is the most suitable.

351. The tubes for hydrogen gas must be marked or tagged to show whether they contain gas or are empty. They should be stored in a dry place to prevent rusting and corrosion of valves.

352. Steel tubes for compressed hydrogen will bear serial numbers to facilitate their identification, and these numbers will be referred to at time of transfers.

353. The principal reliance is on captive balloons. A company of the Signal Corps attached to the headquarters of a field army or of a separate army corps will have charge of the balloon train and its equipment under the general supervision of a chief of staff. The observer should be a well-informed officer. Communication from the basket to the ground would generally be by telephone.

WIRELESS TELEGRAPHY.

354. At present the Signal Corps has no standard wireless-telegraph equipment. There are instruments of many systems in practical and experimental use; therefore requisitions for new material or extra parts must be clearly and completely specified. It is not sufficient in requisitions to state the name of manufacturer only, as the manufacturers are constantly changing and improving their apparatus. All requisitions should contain the following information:

Strain insulators; give size or maximum strain.

Antennae wire; size and kind.

Brushes or parts for generators; give size, rating and name of manufacturer.

Leyden jars; give exact dimensions and maker's name.

Renewals for coherers, responders, or other parts of receiving devices should be fully described.

Tin foil; give size of sheets desired.

Copper strips; specify thickness, width, and length.

Gasoline and oil engines, supplies and parts; give size, rating, and manufacturer's name and serial number of engine.

The same articles can usually be obtained in various sizes for guy wire, Crosby clips, thimbles, "s" hooks, anchors, pulleys, etc.

FIELD GLASSES.

355. There are really but two types of field glasses—viz., the Galilean and prismatic—although there are many makes of each type. Glasses of various makes of both types have been issued to officers, field batteries, and other organizations for test and report. Reports indicate that neither type gives satisfaction under all circumstances.

Varying conditions of temperature, humidity, and clearness of atmosphere make it certain that different types for different conditions will have to be adopted. For example, reports received from

San Antonio, Texas, indicate that the high (6 to 8) power prismatic glasses are there much to be preferred, whereas the artillerymen in northern stations, where the light is less powerful and the atmosphere less clear, give their unqualified approval to the Galilean type of field glass of large diameter and rather low (3½ to 5) magnifying power.

It is of course evident that no one glass can suit everybody, as different persons have eyes of different capabilities. While the most important quality of a glass is definition—that is, the sharpness of the image seen through it—yet the qualities of power, light, and field are but little less important.

No single field glass can furnish a maximum result as to these four qualities, and in consequence all glasses must be compromises. In addition whether a glass is held by a mounted man with a free hand, by one on foot, or in a glass holder very markedly different powers are used with advantage.

The best that can be done is to select certain standard glasses, leaving the individual free to utilize special advantages from a glass most nearly suited to his eyes, position, locality, and special need.

SIGNAL CORPS FORMS.

356. All old forms will be used until supply is exhausted. New numbers have been approved by the Secretary of War, and have the year indicated—1905—after form number.

New No. 1905.	Old No.		New No. 1905.	Old No.	
		DISBURSING.			DISBURSING—continued.
1	None.	Authority for Expenditures. ^a	25	216b	Report of Emergency Purchases not Exceeding \$200.
2	206a	Advertisement for Proposals.			Report of Civilian Employees.
4	2005	Abstract of Proposals. ^a	26	215	Shipper's Receipt.
5	208	Abstract of Proposals.	27	215a	Voucher for Articles or Services.
6	219	Abstract of Expenditures.	28	211	Disbursing Officer's Property Invoice.
8	236	Abstract of Articles Purchased for Immediate Expenditure.	29	None.	
9	237a	Abstract of Articles Purchased and Paid for.			PROPERTY.
10	220	Account Current (small).			Abstract of Property (large or small).
11	220a	Account Current (large).	51	218	Abstract A, Articles Received.
13	None.	Contract (Articles of Agreement).	52	234	Abstract B, Articles Transferred.
14	100c	Contractor's Bond (Principal Individual or Partnership—Surety Individual). ^b	53	234a	Certificate of Expenditure.
			55	205	Certificate of Property Lost or Destroyed.
15	100d	Contractor's Bond (Principal Individual or Partnership—Surety Corporation). ^b	56	206	Estimate for Blank Forms.
			57	209	Invoice.
16	100e	Contractor's Bond (Principal Corporation—Surety Individual). ^b	58	203	Memorandum Receipt.
			59	239	Militia Requisition Blanks.
17	100f	Contractor's Bond (Principal Corporation—Surety Corporation). ^b	60	214a	Post Return of Property.
			61	201	Receipt.
18	235	Instruction for Rendering Bills.	62	204	Requisition for Fire-Control Material and Supplies.
19	240	Letter of Transmittal and Receipt for Check.	63	None.	Requisition for Signal Corps Supplies.
20	None.	Notice of Award and Order Blank, Original Copy. ^a	64	None.	Single Sheets for Depot Property Return.
21	None.	Notice of Award and Order Blank, Duplicate Copy. ^a	65	None.	Single Sheet Return of Property.
22	None.	Pay Roll of Civilian Employees.	66	201a	
23	None.	Requisition for Money. ^a			TELEGRAPH.
24	216a	Report of Emergency Purchases Exceeding \$200.	101	101	Account Current, "This line receipts," officer.

NOTE. 1—^aUsed in the Office of the Chief Signal Officer of the Army only.

2—^bCovers the purchase of supplies only; bonds forming part of contracts for public works must be specially prepared to cover each particular case.

Signal Corps forms—Continued.

New No. 1905.	Old No.		New No. 1905.	Old No.	
		TELEGRAPH—continued.			TELEGRAPH—continued.
102	102	Account Current, "Other line receipts," officer.	137	137	Notice of Nondelivery; sending office.
103	103	Account Current, "This line receipts," station.	138	138	Operator's Number Sheet.
104	104	Account Current, "Other line receipts," station.	139	139	Insulation and Resistance Test Report.
105	105	Check Report.	140	131a	Repairman's Report of Departure.
106	106	Statement of Uncollected Messages, "This line," operator.	141	131b	Repairman's Report of Return.
107	107	Statement of Uncollected Messages, "Other lines," operator.	142	137a	Notice of Nondelivery; receiving office (postal card).
108	108	Transfer Statement of Uncollected Messages, "This line," operator.	143	137b	Messenger's Notice of Nondelivery.
109	109	Transfer Statement of Uncollected Messages, "Other lines," operator.	144	None.	Message Envelopes.
			145	124c	Telegrams sent, large, ruled.
			146	124d	Telegrams sent. ^a
			147	125a	Telegrams received, small, ruled.
			148	125b	Telegrams received, large, unruled.
110	110	Statement of Guaranteed Messages, "This line," operator.	149	125c	Telegrams received, large, ruled.
111	111	Statement of Guaranteed Messages, "Other lines," operator.			MISCELLANEOUS.
112	112	Statement of Guaranteed Messages Transferred, "This line," operator.	201	None.	Reply to Inquiry Concerning S. C. Men (letter). ^a
113	113	Statement of Guaranteed Messages Transferred, "Other lines," operator.	202	None.	Charge Card. ^a
			203	None.	Leave Slips. ^a
114	105a	Check Report, Philippines.	204	None.	Notice of Receipt of Property Return. ^a
115	124b	Telegrams Sent, large, unruled.	205	229a	Clearance to Officers, Property. ^a
116	116	Bill U. S. Military Telegraph Line against "Other lines," operator.	206	None.	Notice of Receipt of Account Current. ^a
117	117	Bill, "Other lines" against U. S. Military Telegraph Lines, operator.	207	None.	Enlistment Letter (Authority). ^a
			208	None.	Monthly Cable Test Sheet.
118	118	Monthly Statement of Amount Paid and Receipted for by Other Lines.	209	None.	Semiannual Report of Telephones, etc.
119	119	Monthly Statement of O. B. & W. D. Telegrams Transferred to Commercial Lines, operator.	210	385	Monthly Report of Employees at Large.
120	120	Statement of Postage and Special Delivery Charges Paid on Commercial Telegrams, operator.	211	None.	Request for Transportation (printed letters to Q. M. G.). ^a
121	121	Invoices of "— line" Tolls Transferred, operator.	212	212	Personal Reports, enlisted men detached service.
122	122	Receipt for "— line" Tolls.	213	213	Personal Reports, officer's.
123	124a	Telegrams Sent, small, ruled.	214	None.	Inventory of Signal Property Sold.
124	124	Telegrams Sent, small, unruled.	215	None.	Account of Sales of Signal Property.
125	125	Telegrams Received, small, unruled.	217	217	Field Message Blank (visual signaling) in pads of 100.
126	126	Check Error Sheet.	222	222	Enlistment Circular. ^a
127	127	Error Card.	224	224	Record Card. ^a
128	128	Message Delivery Sheet.	225	225	Subject Card. ^a
129	129	Monthly Labor and Material Report.	226	226	Cross Reference Card. ^a
			228	228	Letter of Transmittal to Auditor. ^a
130	130	Monthly Line Report.	229	229	Clearance to Officers, Money. ^a
131	131	Repairman's Trip Report.	230	230	Statement of Differences. ^a
132	132	Statement of Remittances.	231	231	Request for Property Return. ^a
133	133	Wrapper, Daily Record of Messages.	232	232	Credit Slip, Property. ^a
134	134	Monthly Message Report.	233	233	Request for Receipts.
135	135	Receiver's Record (large offices only).	237	237	Annual Report of Signal Officers of Posts.
136	136	Delivery Record (large offices only).	241	241	Statement of Qualifications. ^a
			242	None.	Acknowledgment Receipt, Signal Corps Publications. ^a

NOTE 1—^a Used in the Office of the Chief Signal Officer of the Army only.

357. SIGNAL CORPS MANUALS.

No. 1. Telephones. (Obsolete.)

No. 2. Regulations for Military Telegraph Lines.

No. 3. Electrical Instruments and Equipments. (1905 edition embraces both old Nos. 1 and 3.)

No. 4. Submarine Cable Handbook.

No. 5. Photography.

- No. 6. Visual Signaling.
 No. 7. General Regulations, Disbursing and Property Manual.
 No. 8. Fire-Control Equipment. (In preparation.)

STANDARD SPECIFICATIONS.

358. The following index to standard specifications is correct to October 9, 1905. New specifications are added and old ones corrected from time to time. Those marked (*) are not intended for general distribution and are not in printed form.

Title.	Specifi- cation No.	Drawing Nos.	Specifi- cation super- seded.
A.			
Acetylene lantern supplies	267		
Aeroscope, service	319	364a, 364b, 364c, 364d	125
Aeroscope terminals	348	373d	
Aeroscope, Whistler type	228		
Ammeter, millammeter, millivoltmeter, voltammeter, volt- meter	191		
Anchor logs, poles, guy stubs, and wooden pole braces	180		57
Anemometer	159	85a, 85b	
Apparatus, zone signal	302	117, 375a, 375b	
Arms, cross, wooden	177	205	53
Arresters	229		
Atmosphere board	292	365a, 365b, 365c	
*Automobile wagons, S. C., bodies for, on Winton and Cadillac chassis.	327		
B.			
Bag, inspector's instrument	342	99, 153a, 204	
Bag, service tool	312	134	183
Barometers (specification No. 144 forms a part of this specifi- cation)	133	136	
Batteries, dry, special	200	99b	
Batteries, dry, standard	221	99	151
Battery equipment, storage	293		
Batteries, open circuit, wet	201		
Battery, portable, storage	234		
Batteries, primary, method of tests (specifications 89 and 93 form a part of this specification)	94	107a, 107b, 107c, 107d	
Battery, signal, storage	362		
Battery supplies, primary (specification 191 forms a part of this specification)	341	303a, 303b, 306, 310	203
Battery switch	156	137	
Battery, telephone, storage	280		149
Battery, testing, service	185	199b	
Batteries, wet, closed circuit	202	303a, 303b	
Bell, box for large T. I.	155	117, 163a	
Bells and buzzers, vibratory	274		
Bells, time interval	313	117	104
Binding posts and connectors	231	310	
Board, atmosphere	292	365a, 365b, 365c	
*Bodies for S. C. automobile wagons on Winton and Cadillac chassis.	327		
Box, cable terminal, weatherproof	245	111d, 182a, 182b, 182c, 182d	
Box, emplacement outlet	296	356	99
Box, firing signal	295	367	
Boxes, junction, for manholes	92	15	
Box, junction, 3-way	343	399	
Box for large T. I. bell	155	117, 163a	
Box, mortar switch	252	208c, 290a, 290b, 290c	120
Box, outlet, emplacement	296	356	99
Box, outlet, for target-range installation	176	174a, 174b, 174c	
Box, portable, for field telephone	188	174c	
Box, searchlight outlet	297	368	115
Boxes, terminal	269	318a, 318b, 318c, 318d	116
Box, terminal, for submarine cables	314	111d, 255a, 255b	248
Box, terminal, weatherproof, special	367	428	
Braces, wooden pole, anchor logs, guy stubs, and poles	180		57
Brackets for interrupters	325	389	
Bracket, telautograph transmitter	168	180	
Brackets, wooden, pins and plugs	178	75, 206, 207	18-60
Bunting, burgee wool	199	288	
Burgees wool bunting	199	288	

Standard specifications—Continued.

Title.	Specifi- cation No.	Drawing Nos.	Specifi- cation super- seded.
Button, push.....	216		
Buzzers and bells, vibratory.....	274		
*Buzzers, cavalry.....	353	99, 410a, 410b, 410c	
Buzzer, field, model 1905.....	322	319a, 319b, 319c, 374l	232
Buzzer and telegraph table set, combination.....	233		
C.			
Cabinet, cut-out.....	328	377a, 377b, 377c, 377d, 377e, 377f, 377g, 377h, 377i, 377j, 377k, 381e	304
Cabinet, supply.....	193		
Cabinet, storage battery.....	271	228	
Cabinet, storekeeper's file.....	363	301	
Cable, aerial, paper insulated.....	197	425	
Cable, Alaskan type, deep sea, single conductor.....	330		141
Cable, Alaskan type, single conductor, intermediate.....	331		152
Cable, Alaskan type, single conductor, shore end.....	332		153
Cable, armored, lead covered, multiple.....	336		161
Cable clamp, standard (specification No. 96 forms a part of this specification).....	154	162	
Cable (deep-sea and shore-end types), single conductor (Phil- ippine).....	333		162
Cable, deep sea, single conductor, Alaskan type.....	330		141
Cable, distributing switchboard.....	349		127
Cable, double-lead sheathed, paper insulated, submarine.....	237		
Cable, experimental, twenty pair.....	105		
Cable, fire control, single and multiple conductor, submarine, harbor type.....	338		261
Cable-forming strips.....	118	111d	
Cable, harbor type, single and multiple conductor, submarine, fire control.....	338		261
Cable, intermediate, single conductor, Alaskan type.....	331		152
Cable, lead covered, multiple, armored.....	336		161
Cable, lead covered, multiple, unarmored.....	335		160
Cable, multiple, armored, lead covered.....	336		161
Cable, multiple, lead covered, unarmored.....	335		160
Cable, multiple and single conductor, submarine, fire control, harbor type.....	338		261
Cable, paper insulated, aerial.....	197		
Cable, paper insulated, double-lead sheathed, submarine.....	237		
*Cable, paper insulated, power (Brooklyn to Governors Island).....	344		
Cable, paper insulated, standard submarine.....	339		288
Cable (Philippine), single conductor (deep-sea and shore-end types).....	333		162
Cable pole fittings, terminal (specification No. 96 forms a part of this specification).....	273	308a, 308b, 308c, 308d, 354	
*Cable, power, paper insulated (Brooklyn to Governors Island).....	344		
*Cable, power, rubber insulated (for use between Brooklyn, N. Y., and Governors Island). (Specification No. 96 forms a part of this specification.).....	310		
Cable, power, rubber insulated (specification No. 96 forms a part of this specification).....	337		235
Cable (shore-end and deep-sea types), single conductor (Phil- ippine).....	333		162
Cable, shore end, single conductor, Alaskan type.....	332		153
Cable, single conductor, deep sea, Alaskan type.....	330		141
Cable, single conductor (deep-sea and shore-end types) (Phil- ippine).....	333		162
Cable, single conductor, intermediate, Alaskan type.....	331		152
Cable, single and multiple conductor, submarine, fire control, harbor type.....	338		261
Cable, single conductor, shore end, Alaskan type.....	332		153
Cable, single conductor (special light).....	334		164
Cable splicer's chest (specification No. 186 forms a part of this specification).....	318	256, 401	187
Cable, standard paper, insulated, submarine.....	339		288
Cable, submarine, double-lead sheathed, paper insulated.....	237		
Cable, submarine single and multiple conductor, fire control, harbor type.....	338		261
Cable, submarine, standard, paper insulated (specification No. 96 forms a part of this specification).....	339		288
Cable, tree, multiple conductor.....	286		
Cable, switchboard, twenty pair.....	290		
Cable terminal box, weatherproof.....	245	111d, 182a, 182b, 182c, 182d	

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Title.	Specification No.	Drawing Nos.	Specification superseded.
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Cable, testing.....	253		
Cable, twenty pair, experimental.....	105		
Cable, twenty pair, switchboard.....	290		
Cable types, standard, for fire-control construction.....	303		
Cable, unarmored, lead covered, multiple.....	335		160
Case, electrical instrument (specifications Nos. 173, 185, and 186 form a part of this specification).	145	153a, 153b, 166a, 166b, 178a, 178b, 199b, 204	
Case, reagent, for testing electrolyte.....	315		
*Cavalry buzzer.....	353	99, 410a, 410b, 410c	
Cement, insulating.....	347		
Chest, battery signal.....	352		
Chest, cable splicer's (specification No. 186 forms a part of this specification).	318	256, 401	187
Chest, construction tool (specifications Nos. 182, 186, and 312 form a part of this specification).	243	134, 138, 204, 337, 339	172
Chest, electrical engineer's tool.....	192	101a, 101b, 101c, 101d, 101e, 101f	85
*Chests, pack, S. C. for regimental and battalion commanders, field artillery.....	324		
Chests, post tool.....	350	408	
Chest, signal, field battery.....	352	398	
Choke coils for telegraph and telephone circuits.....	23	72	
Circuit, the composite, common, and local battery telephone.....	220	262	148
Clamp, cable, standard (specification No. 96 forms a part of this specification).	154	162	
Cleats, knobs, and tubes, porcelain insulating.....	213	307	
Clock, time-interval.....	305	156, 369a, 369b, 369c, 369d	249
Coils, choke, for telephone and telegraph circuits.....	23	72	
Common, composite, and local battery telephone circuit.....	220	262	148
Composite, common, and local battery telephone circuit.....	220	262	148
Condensers.....	224	374c, 397	
Conduit, enameled iron pipe, metallic flexible, and nonmetallic.....	238		
Connecting cords with flexible armor.....	316	379	
Connectors, binding posts, and.....	231	310	
Construction material, line, standard.....	272	317	
Cords, connecting with flexible armor.....	316	379	
Cords, portable field telephone, for use on target ranges.....	184		
Cross arms, iron poles and fittings.....	226	74a, 74b, 74c	52-56
Cross arms, wooden.....	177	205	53
Cut-off jack set.....	247	260a, 260b	
Cut-out cabinet.....	328	377a, 377b, 377c, 377d, 377e, 377f, 377g, 377h, 377i, 377j, 377k, 381e	304
D.			
Drills, rock.....	132	138	
E.			
Equipment, storage battery.....	293		
Equipments, telephone switchboard.....	189		
F.			
Field buzzer, model 1905.....	322	319a, 319b, 319c, 374l	232
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Fittings, pole line (specification No. 96 forms a part of this specification).	179	211, 212a, 212b, 213, 214, 215	54
Fittings, terminal cable pole (specification No. 96 forms a part of this specification).	273	308a, 308b, 308c, 308d, 354	
Flag kits, 2-foot.....	283	340	
Forming strips, cable.....	118	111d	
G.			
Galvanizing.....	96	106	
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Generator, motor, for cable testing.....	196		
Glass insulators.....	212		
Glasses, field.....	263		
Guy stubs, anchor logs, poles, and wooden pole braces.....	180		57
H.			
Hand wire reel.....	323	357a, 357b, 357c	
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Hooks for time-interval clocks.....	326	390	

100 PROPERTY REGULATIONS SIGNAL CORPS, U. S. ARMY.

Standard specifications—Continued.

Title.	Specifi- cation No.	Drawing Nos.	Specifi- cation super- seded.
I.			
Indicator, wind velocity.....	355	421a, 421b, 421c	
Instrument bag, inspector's.....	342	99, 153a, 204	
Instrument case, electrical (specifications Nos. 173, 185, and 186 form a part of this specification).	145	153a, 153b, 166a, 166b, 178a, 178b, 199b, 204.	
Instrument shelter.....	175	200	
Insulating cement.....	347		
Insulating and splicing materials.....	210		
Insulators for lance lines (specification No. 96 forms a part of this specification).	356	413	87
Insulators, glass.....	212		
Interrupter for time-interval bells.....	298	235	
Irons for time-interval bell boxes.....	329	163b	
J.			
Jack set, cut-off.....	247	260a, 260b	
Junction boxes for manholes.....	92	15	
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K.			
Keys, strap.....	317	312a, 312b	215
Keys, telegraph.....	214	141a, 141b, 209a, 209b	139
Kit, inspector's pocket.....	186	204	
Kit, pipe fitter's.....	276		
Knives, cable sheath.....	275	321	
Knobs, tubes and cleats, porcelain, insulating.....	213	307	
L.			
Lance poles for field telegraph lines.....	96	102	
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